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BUTTERFLIES.—Vol. II.

BY

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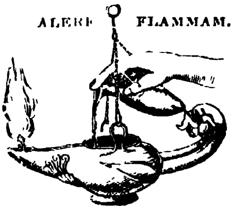
ALERE FLAMMAM.

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PREFACE.

THIS the second volume of the "Butterflies" in the Fauna of British India series gives an account of the families Papilionidæ and Pieridæ, and of five out of the seven subfamilies of the Lycænidæ. Of the Papilionidæ the bulk of the forms come under the genus *Papilio*, in the arrangement of which into groups I have followed the Honorable W. Rothschild's paper, "A Revision of the *Papilios* of the Eastern Hemisphere excluding Africa" (Novitates Zoologicæ, vol. ii, 1895, pp. 165–463).

For the Pieridæ I have found the late Mr. de Nicéville's MS. of his unfinished and unpublished volume of the 'Butterflies of India' most useful. This MS., as already acknowledged in my Volume I, was kindly placed at my disposal by the authorities of the Indian Museum. With regard to the very large number of forms contained in the Lycænidæ, I have found it possible to divide them provisionally into subfamilies on the structural characters of the imago or perfect insect. These subfamilies correspond to a certain extent with the divisions proposed by the late Mr. Doherty ('Journal of the Asiatic Society of Bengal,' vol. lv, pt. 2, 1886, p. 110), which were founded on the *structure of the eggs, and also to the groups as indicated in* the key to the Genera of Lycænidæ in Mr. de Nicéville's vol. iii of the 'Butterflies of India.'

As in the previous volume I have to acknowledge with thanks the help I have received from correspondents and friends. Mr. F. Möller, Darjiling, Major E. Stokes-Roberts, R.E., Capt. W. H. Evans, R.E., Mr. P. Mackinnon, Mussoorie, Mr. E. E. Green and Honorable F. M. Mackwood, Ceylon, Col. C. Swinhoe, late Indian Army, Col. Waller-Barrow, R.A.M.C., Lieut. C. C. Cunningham, 12th Kelat-i-Ghilzai Regt., and others, have been most kind in collecting or lending me specimens.

I have also to express my thanks to the authorities of the British Museum for the free access granted me to the collections and library contained in the Natural History Museum. Without this, I need scarcely say, the present work could not have been accomplished.

With regard to other works in this series, a volume on Phytophagous Beetles, a concluding volume on the Rhynchota, and short volumes on Land-shells and on Beetles belonging to the family Cicindelidæ are in active preparation. Sanction also has been granted by the Secretary of State for India for a volume on the Orthoptera, and for a third and concluding volume of the Butterflies.

C. T. BINGHAM.

London,
March 1907.

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ERRATA.

Page 19. *Papilio hector*. Reference to Pl. XI, fig. 83 omitted.
„ 25. *Papilio varuna*, race *astorion*. Ditto to fig. 84 omitted.
„ 62. *Papilio polytes*, aberration. Reference should be to Pl. XVI, fig. 104, not to fig. 105.
„ 217. *Saletara chrysæa*. Reference should be to Pl. XVII, figs. 114 and 115, not to figs. 14 & 15.
„ 274. *Hebomoia glaucippe*, race *australis*. Reference to Pl. XVIII, fig. 122 should be transferred to after *Hebomoia roepstorfi* on page 276.

Order LEPIDOPTERA.

Suborder *PAPILIONINA.*

Family PAPILIONIDÆ.

Egg. "Dome-shaped, smooth or obscurely facetted, not as high as wide, somewhat leathery, opaque." (*Doherty.*)

Larva. Stout, smooth or with a series of fleshy tubercles on the dorsum; sometimes with a raised fleshy protuberance (the so-called hood or crest) on the fourth segment which is also generally thickened above. The second segment has a transverse opening, out of which the larva can protrude at will an erect, forked, glandular fleshy organ that emits a strong, somewhat pleasant, but always penetrating odour.

Pupa. Variable in form but superiorly most often curved backwards, sometimes very strongly so; angulate, with the head truncate or rounded, often bifid; back of abdomen smooth or tuberculate. Attached by the tail, normally in a perpendicular position, and further secured by a silken girth round the middle. In *Parnassius* strangely enough the pupa is placed in a loose silken web between leaves.

Imago. Wings extraordinarily variable in shape. Hind wing very frequently with a tail, which may be slender, or broad and spatulate, but is always an extension of the termen at vein 4. In one genus, *Armandia*, the termen of the hind wing is prolonged into tails at the apices of veins 2 and 3 as well as at vein 4. Fore wing (except in the aberrant genera *Parnassius* and *Hypermnestra*) with all 12 veins present and in addition a short internal vein, vein 1 *a*, that invariably terminates on the dorsal margin. There is also a short transverse vein present at base of wing between the median vein and vein 1 *a* in all genera except *Leptocircus*, *Armandia*, *Parnassius*, and *Hypermnestra*. Hind wing: vein 1 *a* absent; precostal vein and precostal cell both present; dorsal margin not excavated so as to receive the abdomen, but in the male frequently folded over and studded within the fold with specialized scales (androconia) or hairs that are often strongly scented. Antennæ comparatively short, with generally a distinct club; "the distal joints mostly more expanded ventrally than dorsally, so that the club is curved dorsad" (*Jordan*). The scaling most extended in *Leptocircus*, but in *Papilio* confined to the basal joints. Body stout; claspers at apex of abdomen in the male generally well-developed, absent in a few forms. Six walking legs; the fore tibiæ with a medial pad; claws simple except in one form of *Leptocircus*, which has them bifid.

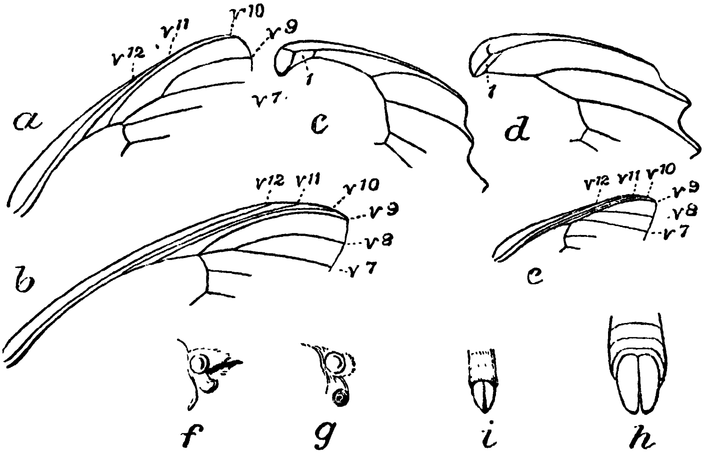

Fig. 1.—*a.* Venation of anterior portion of fore wing—*Parnassius.*
b. Do. do. do. —*Papilio.*
c. Venation of anterior portion of hind wing—*Armandia.*
(*1*) Precostal cell.
d. Venation of anterior portion of hind wing—*Papilio.*
(*1*) Precostal cell.
e. Venation of anterior portion of fore wing—*Leptocircus.*
f. Side view of head—*Teinopalpus.*
g. Do. do. —*Papilio.*
h. Anal valves of group *Ornithoptera.*
i. Do. do. typical *Papilio.*

Key to the Genera of the Papilionidæ.

A. Fore wing: vein 8 present.
  a. Hind wing: precostal cell elongate, longer than broad .... ARMANDIA, p. 3.
  b. Hind wing: precostal cell short, much broader than long.
    a'. Fore wing: vein 11 out of basal half of subcostal; hind wing remarkably long, narrow, and posteriorly attenuate. LEPTOCIRCUS, p. 5.
    b'. Fore wing: vein 11 out of apical half of subcostal; hind wing not remarkably long, often tailed but not posteriorly attenuate.

a^2. Head produced in front, palpi long, porrect; seen from side beak-shaped .... Teinopalpus, p. 7.
b^2. Head not produced in front; palpi short, pressed close into face, not porrect .... Papilio, p. 10.
B. Fore wing: vein 8 absent.
a. Club of antennæ long, gradual, cylindrical. Parnassius, p. 116.
b. Club of antennæ short, abrupt, flattened.. Hypermnestra, [p. 131.

Genus ARMANDIA.

Armandia, *Blanchard, Comptes Rendus*, lxxii, 1871, p. 809; *Kirby, Allen's Nat. Hist., Butt.* ii, 1896, p. 247; *Moore, Lep. Ind.* v, 1901–1903, p. 124.
Bhutanitis, *Atkinson, P. Z. S.* 1873, p. 570.

Type, *A. thaidina*, Blanchard, from W. China.

Range. Bhutan; Assam; Upper Burma; W. China.

♂ ♀. Fore wing elongate; costa nearly straight; apex very broadly rounded; termen oblique; tornus obtusely rounded; dorsum straight; veins 1 to 12 present; cell longer than half length of wing, veins 6 and 7 closely approximate at origin, both from upper apex of cell, upper discocellular therefore absent; middle long, concave, lower inwardly oblique; vein 9 from well beyond upper apex of cell, 10 and 11 free from apical half of subcostal. Hind wing: costa arched, upper portion of termen scalloped, in the Indian form the emarginations are deep and thus make short broad tails or a broad acute tooth at apices of veins 5 and 6; in both the typical and Indian forms there are long slender tails at apices of veins 2, 3, and 4, the tail at apex of vein 4 very long, that at apex of vein 3 shorter and at apex of vein 4 shorter still; tornal angle lobed and rounded, dorsum straight; cell moderately long; upper discocellular about half the length of the middle but much longer than the lower discocellular; precostal cell longer than broad. Antennæ short, about one-fourth the length of the fore wing; club long and gradual, but well-marked; head not produced in front; palpi slender, porrect; body moderately robust.

Two forms are known, one of which only has been so far recorded from within our limits.

480. **Armandia lidderdali**, *Atkinson* (Bhutanitis), *P. Z. S.* 1873, p. 570, pl. 50, ♂; *Kirby, Syn. Cat. Di. Lep. Suppl.* 1877, p. 808; *Moore, Lep. Ind.* v, 1901–1903, p. 125, pl. 413, figs. 1, 1 *a*, ♂ ♀.

♂ ♀. *Upperside* dull black. Fore wing with the following ochraceous-white slender markings:—basal, subbasal, medial, and preapical lines from costa across cell, the first three continued in a series of more or less diffuse curves to the dorsal margin, the preapical terminates on vein 3; beyond apex of cell a somewhat broken transverse line from costa to vein 3 followed by a complete discal transverse line, a short upper postdiscal somewhat ill-defined line that terminates on vein 4 and a subterminal complete line; all the lines except those that cross the cell formed of a series of short curved lines in the interspaces. Hind wing with similar ochraceous-white lines more or less in continuation of those on the fore wing with the addition of a broad line along vein 1 and the median vein, these two lines do not reach much beyond the base of vein 4; a large lower discal patch, the inward half scarlet, the outer half velvety-black, followed by broad subterminal bright yellow lunules in interspaces 1 to 4; the tails edged very narrowly with ochraceous white; the black on the outer half of the discal patch has in interspaces 1 and 2 very large ill-defined superposed white spots thickly shaded with brownish grey except along their inner margins. *Underside* similar, all the markings broader, base of cell in hind wing crossed by a short ochraceous-white bar, and the edges of the precostal cell with narrow lines of the same colour. Antennæ black; head, thorax, and abdomen dull black; the thorax greenish grey laterally, the sides of the abdomen with cross-lines of ochreous white.

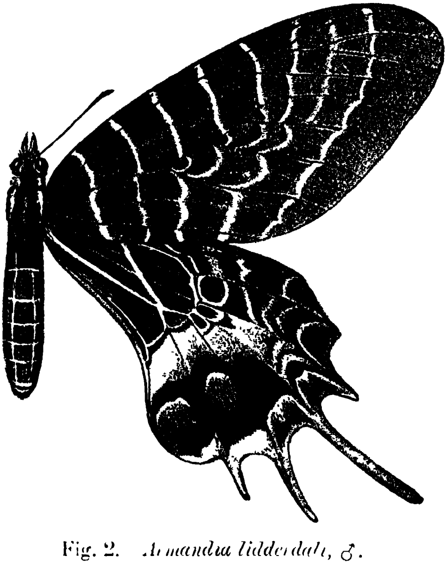

Fig. 2. *Armandia lidderdali*, ♂.

Exp. ♂ ♀ 115-124 mm. (4·15-4·78″).

Hab. Bhutan; Assam, the Naga Hills; Upper Burma, the Chin Hills.

Mr. Doherty found this beautiful insect in considerable numbers in the Naga Hills. Speaking of its habits and the localities in which it occurs, he says:—"It generally keeps to the ridges, occasionally descending into the valley, once almost down to 5000 feet. Afterwards I found it on the western side of Japoo at 7000-

8000 feet, and between the two places we got one or two every day. At Mas, in Manipur, I have taken worn specimens at 7500–9000 feet. My Lepchas, who collected at Buxa in Bhutan, say there is no chance of another brood....... The butterfly drifts about among the tree tops, rarely descending to the ground; the crimson of the hind wings is not so conspicuous as one might think, and if one loses sight of it for an instant, it is very hard to make out again, its transparent dark grey wings being hardly distinguishable among the shadows, and it is blown about by the wind more like a dead leaf than a living insect. Its flight is much like that of *Hestia* but less buoyant and circling, as might be expected from its angular wings; nevertheless its resemblance strikes one. Seen from above it must be much more conspicuous and is no doubt a protected insect; at the same time its weak flight may even add to its chance of escape as it certainly does with *Hestia*, for it is impossible to calculate the direction in which it is making. The whole body and wings give out a delicious odour, which remains for some days after death. In some positions and at some distance *Armandia* looks like *Danais tytia*, Gray, which is very common in the same places. *Armandia* hovers about flowers like other *Papilios*. During rain it alights on a leaf and droops its fore wings over the hind ones, thus covering the bright colours."

The late Capt. Watson, who recorded this insect from the Chin Hills in Burma, states that it is single-brooded. Mr. Doherty, however, in the Naga Hills, took several specimens in good condition towards the end of September, so that apparently there is an autumn brood in some localities.

Genus **LEPTOCIRCUS.**

Leptocircus, *Swainson, Zool. Illust., Ins.* ii, 1833, pl. 106; *Dblday., Westw. & Hew. Gen. Di. Lep.* i, 1847, p. 22; *Moore, Lep. Ind.* v, 1901-1903, p. 132.

Type, *L. meges*, Zinken-Sommer, from Java.

Range. Malayan Subregion; Assam to Java.

♂ ♀. Fore wing: costa slightly arched at base, then straight, the apex curved downwards; termen straight; tornus well-marked; dorsum straight; cell narrow, short, not half length of wing, its upper apex acute; discocellulars, upper and middle oblique, subequal; vein 8 out of 7 beyond upper apex of cell; 10 and 11 free, 10 from upper third, 11 from above middle of subcostal vein. Hind wing long, produced at vein 4 into a very long, very narrow tail; cell remarkably short, about one-seventh of the dorsal margin; shoulder of costal margin at base strongly angulate, the apex of the angle rounded. Antennæ long; club broad, abrupt, spatulate; palpi short, closely approximate to the head, as in most of the forms in the family. Male sex-mark present in one of the forms (absent in the other), as a tuft of long radiating hairs at the base of the dorsal margin.

Key to the forms of Leptocircus.

a. Fore wing: terminal black edging broad and broadened towards apex of wing; transverse band white, discal rather than subbasal .... *L. curius*, p. 6.

b. Fore wing: terminal black edging narrow, not broadened towards apex of wing; transverse band green, subbasal rather than discal .... *L. meges*, p. 6.

481. **Leptocircus curius,** *Fabr.* (Papilio) *Mant. Ins.* ii, 1787, p. 9; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 85; *id. Lep. Ind.* v, 1901-1903, p. 134, pl. 417, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂ ♀. *Upperside* dull brownish black. Fore wing: a broad outwardly oblique white transverse band that crosses from a little beyond the basal third of the costal margin to the dorsum, its outer half hyaline, followed by a hyaline triangular area that does not reach the costa or the termen but is traversed by conspicuously black veins. Between the semihyaline transverse band and the hyaline area the black forms a more or less even band slightly narrower in the middle; the black edging to the costa and termen broad, broadened towards the apex; cilia black. Hind wing: the transverse white band of the fore wing is continued straight across and ends in a point on the outer half of vein 3, but is not hyaline along its outer margin; posterior half of the wing dull dark brown, irrorated towards the base of the long narrow tail at vein 4 with white scales; cilia black, white below vein 5 and along outer side of basal half of tail, the latter tipped white. *Underside* similar, but the ground-colour opaque brownish black; a broad outwardly ill-defined earthy-grey streak along the base of the wings produced slightly down the dorsal margin of hind and along the costa of the fore wing; the oblique white band on the hind wing joined by a cross sinuous short white line from the dorsal margin to its apex; below this latter a number of irregular white spots on the tornal area. Antennæ, head and thorax black, abdomen dark brownish black; beneath, the palpi, thorax and abdomen greyish; claws of the tarsi bifid. Male with sex-mark.

Exp. ♂ ♀ 42–52 mm. (1·68-2·0").

Hab. Assam; Burma; Tenasserim; extending to the Malay Peninsula, Siam, C. and W. China.

482. **Leptocircus meges** (Pl. XI, fig. 81), *Zinken-Sommer* (Papilio), *Nov. Act. Acad. Nat. Cur.* xv, 1831, p. 161, pl. 15, fig. 8; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 85; *id. Lep. Ind.* v, 1901-1903, p. 136, pl. 417, figs. 2, 2 *a*, 2 *b*, ♂ ♀.

Leptocircus virescens, *Butler, Cat. Fabr. Lep. B. M.* 1869, p. 259.

♂ ♀. Very closely resembles *L. curius*, but differs constantly as follows:—Transverse band across fore wing placed further in towards the base; this band on both fore and hind wing greenish, not white, and not as in *curius* with its outer margin hyaline on the fore wing; black terminal edging to fore wing narrower, of even width throughout. Male without sex-mark.

Exp. ♂ ♀ 44–50 mm. (1·76–nearly 2″).

Hab. Burma; Tenasserim; extending into the Malayan Subregion as far as Java.

In October 1892, on the Taungjah Pass over the Dawnat Range in Tenasserim, the late Mr. de Nicéville and I found a ♀ of this form ovipositing on the underside of the leaves of a creeper with compound leaves, each leaf consisting of three leaflets. This plant was subsequently identified by Dr. David Prain as *Illigera burmanica*, King, family *Combretaceæ*. The eggs, of which we collected two or three, were spherical, smooth, pale green, almost transparent, and of the usual papilionid form.

Genus **TEINOPALPUS.**

Teinopalpus, *Hope, Trans. Linn. Soc. Lond.* xix, 1843, p. 131; *Moore, Lep. Ind.* v, 1901–1903, p. 127.

Type, *T. imperialis*, Hope, from N.E. India.

Range. Sikhim; Bhutan; Assam; Western Upper Burma; Tenasserim; C. China.

♂ ♀. Fore wing broadly triangular; costa arched; apex acute, slightly produced and falcate in the ♂; termen slightly concave in ♂, straight in ♀; tornus rounded; dorsum straight, about three-fourths the length of the costa; cell rather short, not quite half length of wing; upper discocellular very short, not half length of middle; middle long, concave, about twice length of lower; vein 9 from apex of cell or from a little beyond; 10 and 11 free. Hind wing, ♂: costa arched; termen scalloped or zigzag, broadly toothed at apices of all the veins except vein 4, at apex of this it is produced into a long slender non-spatulate tail; dorsum slightly incurved, without an abdominal fold; ♀ differs from the ♂ as follows:—the termen produced at apices of veins 2, 3, and 5 into short tails, and at apices of veins 4 and 6 into long narrow non-spatulate tails; cell short, upper discocellular much longer than middle. Antennæ short, about one-third length of fore wing; club short, broad, somewhat abrupt; head produced in front, tufted, palpi porrect; viewed sideways the projecting front and palpi have somewhat the appearance of a bird's beak; legs slender.

Key to the forms of Teinopalpus.

♂ ♂.

a. Upperside of hind wing: discal yellow fascia extended into apex of cell .... *T. imperialis*, p. 8.

b. Upperside of hind wing: discal yellow fascia not extended into apex of cell .... *T. imperatrix*, p. 9.

♀ ♀.

a. Upperside of hind wing: upper discal patch grey or violet-grey .... *T. imperialis*, p. 8.

b. Upperside of hind wing: upper discal patch diffuse dusky black .... *T. imperatrix*, p. 9.

483. **Teinopalpus imperialis** (Pl. XI, fig. 80), *Hope, Trans. Linn. Soc.* xix, 1843, p. 131, pl. 11, figs. 1, 2, ♂; *Moore, Lep. Ind.* v, 1901–1903, p. 128, pl. 414, figs. 1, 1 *a*–1 *c*, ♂ ♀.
Teinopalpus parryiæ, *Hope, Trans. Linn. Soc.* xix, 1843, p. 131, pl. 11, figs. 3 & 4, ♀.
Teinopalpus imperialis, *race* himalaicus, *Rothsch. Nov. Zool.* v, 1898, p. 602.
Teinopalpus himalaicus, *Moore, Lep. Ind.* v, 1901–1903, p. 130, pl. 415, figs. 1, 1 *a*, ♂ ♀.

♂. *Upperside* black, densely irrorated with green scales. Fore wing: an outwardly oblique, slightly concave subbasal band and a narrow terminal edging jet-black due to the ground-colour there being devoid of the green scaling; beyond the subbasal band the irroration of scales is a much brighter green, especially along the outer edge of the subbasal band itself; but along obscure, broad, convergent discal and postdiscal transverse bands and along a subterminal much narrower band, the green scaling thins out and the black ground-colour of the wing shows through; in some specimens, owing to the transparency of the wings, the rich ochraceous-brown colour of the underside gives the black on these bands a reddish tint. Hind wing: basal area margined outwardly by a narrow irregularly sinuous band devoid of green scaling, succeeded by an upper discal bright chrome-yellow patch that spreads from base of interspace 3 across the apex of the cell and bases of interspaces 4 and 5 to the costa; this patch is bluntly angulated outwards in interspace 5, stained with orange anteriorly and bordered outwardly by black which is widest above: below the patch a white line extends to the dorsum; the postdiscal area is deep dark green, margined inwardly by diffuse dark grey and followed outwardly by a subterminal series of lunular markings, the tornal and upper two or three of which are yellow, the rest bright green; tail tipped with yellow. *Underside*: basal area of both fore and hind wing densely covered with green scales. Fore wing: terminal two-thirds rich ochraceous brown, the green of the basal area bordered by black; discal and postdiscal bands also black, widened and diffusely coalescent posteriorly; an incomplete, very slender subterminal black line and broader black terminal edging, neither of which reaches to the apex. Hind wing much as on the upperside, but the yellow markings broader. Antennæ dark red; head, thorax and abdomen black, covered somewhat densely with green hairs and scales.—♀ much larger, differs also in coloration and markings as follows:—*Upperside*, fore wing: the irroration of green scales on the terminal two-thirds restricted to a subterminal moderately broad band diffuse along its inner edge, and a medial somewhat ill-defined similar band that is bordered both on the inner and outer sides by diffuse dusky black; this is succeeded by two broad diffuse transverse dark grey bands, the outer of the two edged on its outer side narrowly with black, followed by a subterminal green band and terminal velvety-black margin. Hind wing: the upper discal yellow patch so conspicuous in the ♂, replaced by a very much larger dark grey patch, below which comparatively narrow markings of yellow extend up to the dorsum; a postdiscal sinuous lunular narrow black band and a subterminal series of green lunules as in the ♂, but the apical lunule dark grey, not yellow; the tail-like extensions of the termen at the apices of veins 3 to 6 are black shaded with green, those at the apices of veins 4 and 6 tipped, the former with yellow the latter with greenish-white. *Underside* similar to the underside in the ♂, but on both fore and hind wing the areas coloured with rich ochraceous and yellow are grey, with the exception of a well-marked moderately broad subterminal band on the fore wing which is of a dull ochraceous colour; on the hind wing the grey discal area extends right up to the apical lunule of the subterminal series. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 90–127 mm. (3·55–5").

Hab. Sikhim, above 6000 ft.; Bhutan; the hills of Assam and of Western Upper Burma; Central China.

The larva of this magnificent butterfly, according to Mr. Knyvett, feeds on *Daphne nipalensis*, but so far as I know, no description of it has been published.

I am quite unable to separate the Sikhim form of this insect, even as a race. The points of difference between it and the Assam form are extremely variable, and the most prominent of these, viz. the paler tint of the grey area on the upperside of the hind wing in the ♀, is perhaps the most variable of all the characters.

An Assam specimen of the ♀ in the collection of the British Museum is far and away paler than any Sikhim specimen I have seen.

Mr. Elwes says that in Sikhim this insect is only found in the forest region from about 6000 to 10,000 feet elevation, and that "it is most difficult to capture on account of its remarkably strong, rapid and dashing flight, and its habit of resting on high trees, from which it flies only during a few hours of the morning" (Elwes, Trans. Ent. Soc. 1888, p. 421).

The females are much scarcer than the males. I once saw a ♀ on the wing and rather low down, in a clearing on the hill above the Rungarun Forest bungalow near Darjiling. According to Col. Swinhoe, *T. imperialis* is common in the Khasia Hills in Assam.

484. **Teinopalpus imperatrix**, *de N. Jour. Bomb. N. H. Soc.* xii, 1899, p. 335, pl. BB, ♂ ♀ *Moore, Lep. Ind.* v, 1901-1903, p. 131, pl. 416, figs. 1, 1 *a*, ♂ ♀.

♂. "Differs from *T. imperialis*, Hope . . . . . in the following particulars:—*Upperside*: fore wing darker green, the black ground-colour showing through the green scales more prominently. Hind wing with the rich chrome-yellow discal fascia with its inner edge not encroaching on the discoidal cell instead of reaching well into it, that portion of the fascia in the second subcostal interspace considerably longer; all the tooth-like projections on the outer margin much longer, especially those at the terminations of the 2nd subcostal and 1st median nervules. *Underside*: fore wing with the five black fasciæ crossing the wing much broader, especially the middle one. Hind wing with the discal yellow fascia broader.—♀. Considerably larger than that sex of *T. imperialis. Upperside*: both wings much darker, all the black coloration more prominent. Hind wing has the pale violet black-irrorated discal area of *T. imperialis* almost entirely replaced by a black suffused area, the black line closing the cell entirely obliterated; the chrome-yellow subanal area at least twice as broad, the outer discal lunulated black fascia consequently placed much nearer to the outer margin; all the tails very much longer. *Underside*: both wings with much the same differences as on the upperside.

"*Exp.* ♂ ♀ 4·4–5·7 inches.

"*Hab.* Taungoo Hills, 4000 feet, Upper Tenasserim, Burma."

The type specimens are now in Mr. Rothschild's collection.

Genus **PAPILIO**.

Papilio, pt., *Linn. Syst. Nat.* ed. x, i, 1758, p. 458.
Papilio, *Latr. Hist. Nat. Crust. et Ins.* iii, 1803, p. 387.
Troides, *Hubner, Verz. bek. Schmett.* 1816, p. 88.
Ornithoptera, *Boisduval, Voy. Astr., Lep.* 1832, p. 33.

Type, *P. priamus*, Linn., from Amboina.

Range. Both hemispheres.

♂ ♀. Wings vary extraordinarily in shape and in expanse. Fore wing: cell about half the length of the wing or more; upper and middle discocellulars subequal or upper slightly longer than middle, lower discocellular bent sharply inwards at an angle so as to apparently form the apical portion of the median vein; veins 7 and 8 stalked, the furcation at varying distance beyond apex of cell, but the fork generally long; vein 9 from upper apex of cell; 10 and 11 free, in one section vein 11 anastomosed with 12, both originate from beyond middle of subcostal vein. Hind wing: cell and discocellulars very variable in length, precostal spur simple. Antennæ comparatively short; club generally gradual but distinct; eyes naked; palpi short, pressed close into the face.

Linnæus placed under *Papilio* a vast number of butterflies, now arranged in different families, dividing them merely into groups. Latreille first restricted the name to the "swallow-tails." "In this action he has been followed by all authors . . . . . until now it has become the all but universal custom to apply it to an immense group." (*Scudder.*)

In this work I have with one or two alterations followed Rothschild's revision of the genus *Papilio* (Nov. Zool. ii, 1895, pp. 167–463), and have accepted the groups and their sequence as arranged by him. I have, however, placed *Troides*, Hübner =

Ornithoptera, Boisduval, which Rothschild has as a distinct genus, under *Papilio* as an additional group. A division of the Indian "swallow-tails" into groups, founded on the structure of the larva and pupa, was also proposed by Messrs. Davidson & Aitken (Jour. Bomb. N. H. Soc. v, 1890, p. 361), but their paper deals only with the very limited number of the forms found in the Bombay Presidency.

There is no hard and fast rule as to the value of characters that may serve for generic distinction: it varies in each order of insects. The subdivision of the large and unwieldy genus *Papilio* will be a convenience. This has already been carried out by Mr. Moore in the 'Lepidoptera Indica' and also by other writers, but, as I understand, Mr. Rothschild and Dr. Jordan are now engaged on a fresh revision of the genus founded on an examination of the forms of these insects from all parts of the world, I prefer to await the result of their studies, and in the meantime have adopted Mr. Rothschild's tentative arrangement.

Key to the Groups of Papilio.

A. Fore wing: vein 11 not anastomosed with vein 12.
  a. Males without anal valves to abdomen .. Hector group, p. 18.
  b. Males with anal valves to abdomen.
    a'. Anal valves open on upperside ...... Coon group, p. 23.
    b'. Anal valves not open on upperside, normal.
      a^2. Wings large, of comparatively great expanse; abdomen remarkably heavy and massive; anal valves very large, prominent .... Ornithoptera group, p. 13.
      b^2. Wings generally of less expanse: abdomen not particularly heavy or massive; anal valves of moderate size.
        a^3. No conspicuous blue or green colouring or markings on upperside of wings.
          a^4. Hind wing: upper and middle discocellulars subequal, or upper shorter than middle.
            a^5. Both sexes: hind wings without tails .... Nox group, p. 25.
            b^5. Both sexes: hind wings with tails .... Latreillei group, [p. 27
          b^4. Hind wing: upper discocellular longer than middle.
            a^5. Fore wing not acutely pointed at apex, not falcate.
              a^6. Upperside of fore wing in ♂ densely clothed with short hairs on its terminal half .... Helenus group, p. 41.

- b^6. Upperside of fore wing in ♂ not densely clothed with hair on its terminal half.
  - a^7. Hind wing tailed in one sex only.
    - a^8. Hind wing not tailed in ♂, always tailed in ♀; dorsal margin of wing on underside bordered with red .. RHETENOR group, p. 54.
    - b^8. Hind wing not tailed in ♂, sometimes tailed in ♀; a patch of red at base but no border of red along dorsal margin .... MEMNON group, p. 46.
  - b^7. Hind wing tailed in both sexes *.
    - a^8. Tail short, slender, not spatulate .... MACHAON group, p. 35.
    - b^8. Tail longer, broader, spatulate.
      - a^9. Underside: a patch of red at base of wings .... BOOTES group, p. 55.
      - b^9. Underside: no patch of red at base of wings .... NEPHELUS-POLYTES group, p. 58.
  - c^7. Hind wing without tail in both sexes.
    - a^8. Hind wing: upper discocellular nearly as long as subcostal vein.
      - a^9. Fore wing elongate; dorsal margin less than half length of costal .... PROTENOR group, p. 52.
      - b^9. Fore wing shorter, broader; dorsal margin at least two-thirds length of costal.
        - a^{10}. Fore wing: vein 8 out of basal fourth of 7 .... CLYTIA group, p. 73.
        - b^{10}. Fore wing: vein 8 out of basal third of 7 .... CASTOR group, p. 65.
    - b^8. Hind wing: upper discocellular much shorter, not half length of subcostal vein .... AGESTOR group, p. 69.

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* Except in *Papilio demoleus*, Linn., neither sex of which has the hind wing tailed.

b^5. Fore wing acute and curved at apex, strongly falcate....	PAYENI group, p. 91.
b^3. With conspicuous green or blue colouring and markings on upperside.	
a^4. Hind wing without tail	ELEPHENOR group, [p. 80.
b^4. Hind wing with tail.	
a^5. Fore wing in ♂ with or without woolly adnervular streaks on upperside.	
a^6. Such streaks always present, one along middle of interspace 1	BIANOR group, p. 81.
b^6. Such streaks not always present, when present none along middle of interspace 1	PALINURUS group, [p. 88.
b^5. Fore wing in ♂ without any woolly streaks	PARIS group, p. 84.
B. Fore wing: vein 11 anastomosed with vein 12.	
a. Fore wing short and broad; dorsal margin much more than half length of costal.	
a'. Hind wing with slender tails.	
a^2. Hind wing in ♂ without a cottony scent-organ on the inner side of abdominal fold.	
a^3. Fore wing: upper discocellular very much longer than middle discocellular..................	GLYCERION group, [p. 93.
b^3. Fore wing: upper discocellular very little longer than middle discocellular..........	ANTIPHATES group, [p. 96.
b^2. Hind wing in ♂ with a cottony scent-organ on the inner side of abdominal fold.	
a^3. Fore wing: white bands on anterior portion without scales on upperside	AGETES group, p. 100.
b^3. Fore wing: white bands on anterior portion with scales on upperside	ARISTEUS group, p. 101.
b'. Hind wing without tails	MACAREUS group, [p. 112.
b. Fore wing more elongate; dorsal margin about half as long as costal	EURYPYLUS-AGAMEMNON group, [p. 105.

ORNITHOPTERA GROUP.

♂ ♀. Fore wing: costa arched; apex not acute, rounded; termen oblique; tornus well-marked but rounded; dorsum straight; cell more than half length of wing; upper discocellular slightly oblique, shorter than middle in the Indian forms, middle concave; veins 10 and 11 free, 10 from upper third, 11 from middle of subcostal. Hind wing not tailed in the Indian forms;

costa short; termen strongly curved, round, scalloped; tornus prominent but rounded; dorsum straight; abdominal fold in ♂ moderately broad, lined within with a cottony scent-organ. Antennæ elongate, club curved; thorax and abdomen robust, the latter very massive; ♂ anal valves very large and prominent. Pupa, unlike that of the other groups of the genus, sustained by separate lateral threads attached to a tubercle on each side and not by a loop round the middle.

Key to the forms of the Ornithoptera *Group.*

♂♂.

a. Underside of hind wing: cell yellow, black only at extreme base.
  a'. Underside of hind wing: interspace 1 yellow, with a large oval and a smaller black spot in terminal third, or yellow with posterior half diagonally black.
    a². Underside of hind wing black along costal margin, extended into interspace 7 ...... *P. helena*, race *cerberus*, p. 14.
    b². Underside of hind wing black along costal margin, not extended into interspace 7 .. *P. æacus*, p. 15.
  b'. Underside of hind wing: interspace 1 black, with a narrow yellow streak anteriorly .... *P. minos*, p. 16.
b. Underside of hind wing: cell black; apex only yellow, basal half at least black .... *P. darsius*, p. 17.

♀♀.

a. Underside of hind wing: interspace 7 black, no yellow spot at its base .... *P. helena*, race *cerberus*, p. 14.
b. Underside of hind wing: interspace 7 black, with a small yellow spot at its base.
  a'. Cell yellow, basal third only black .... *P. æacus*, p. 15.
  b'. Cell black, apex only yellow ... . *P. darsius*, p. 17.
c. Underside of hind wing: interspace 7 black, with a large yellow spot at base or basal half yellow. *P. minos*, p. 16.

485. **Papilio helena**, *Linn. Syst. Nat.* ed. x, 1758, p. 461.

Race cerberus (Pl. XI, fig. 82).

Papilio pompeus, *Gray* (*nec Cramer*), *Cat. Lep. Ins. Brit. Mus.* i, 1852, p. 5; *Moore* (*nec Cramer*, Ornithoptera), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 87, ♂ ♀; *Elwes* (*nec Cramer*, Ornithoptera), *Trans. Ent. Soc.* 1888, p. 422.
Papilio cerberus, *Felder*, *Verh. zool.-bot. Ges. Wien*, xiv, 1864, p. 291; *Moore* (Ornithoptera), *Lep. Ind.* v, 1901–1903, p. 145, pl. 490, figs. 1, 1 *a*–1 *c*, ♂ ♀.
Ornithoptera heliaconoides, *Moore*, *P. Z. S.* 1877, p. 592; *W.-M. & de N. J. A. S. B.* 1880, p. 237; *Moore*, *Lep. Ind.* v, 1901–1903, p. 147, pl. 491, figs. 1, 1 *a*–1 *c*, ♂ ♀.
Troides helena cerberus, *Rothsch. Nov. Zool.* ii, 1895, p. 219, ♂ ♀.

Race **cerberus**, Felder.—♂. *Upperside*: fore wing rich velvety black with adnervular pale streaks on either side of the veins beyond the cell: cilia short, black, alternated with pale buffy white in the middle of the interspaces. Hind wing: the abdominal fold, the apical half obliquely of interspace 1, the termen broadly, the base of the cell and the costal area up to and including the basal half of interspace 7 velvety black, the rest of the wing rich silky yellow; the veins prominently but narrowly black; the inner margin of the terminal black border produced inwards into prominent cone-shaped markings in the interspaces. All specimens have one or more postdiscal black spots in the interspaces, but never a complete series; in interspace 2 and sometimes also in interspace 3 these spots coalesce with the cone-shaped projections of the terminal black border. Underneath the abdominal fold is a dense mass of buffy-white scented cottony pubescence. *Underside* similar, the adnervular pale streaks on the fore wing broader and more prominent. Hind wing: dorsal margin broadly black, with an edging of long soft black hairs; interspace 1 with a large oval postdiscal and a terminal black spot; interspace 2 with the postdiscal black spot generally separate from the cone-shaped projection of the black terminal border; the apical and lateral margins of interspaces 2–6 pale yellow irrorated with black scales. Antennæ, head and thorax black, the collar narrowly crimson; abdomen yellow, shaded above with black; beneath: the thorax with a large lateral patch of crimson, the anal segment prominently buff-coloured.—♀. *Upper* and *under sides* similar to those in the ♂, but with the following differences:—Fore wing: the adnervular pale streaks broader and more prominent. Hind wing: the black at base and along the costal margin broader, occupying fully one-third of the cell, the area above it and above vein 7, interrupted however, in interspace 7 near the apex of wing, by a transverse yellow mark which is sometimes subobsolete; a postdiscal series of large oval black spots, those in interspaces 2 and 3 often joined on the upperside to the cone-shaped terminal black marks; dorsal margin also more broadly black, destitute of the fringe of black hairs and of course of the abdominal fold. Antennæ, head and thorax as in the ♂: abdomen dark brownish black above.

Exp. ♂ ♀ 150–180 mm. (5·95–7·15").

Hab. Sikhim; Bhutan; Assam; Burma; Tenasserim; the Andamans and the Malayan Subregion to Sumatra.

Andaman specimens (*heliaconoides*, Moore) are often both ♂ and ♀ darker, with the adnervular pale streaks on the fore wing almost if not quite obsolete on the upperside. The insect, however, has not been sufficiently differentiated to form even a distinct race.

486. **Papilio æacus**, *Felder* (Ornithoptera), *Wien. Ent. Monats.* iv, 1860, p. 225, ♀; *Rothsch.* (Troides) *Nov. Zool.* ii, 1895, p. 223; *Moore* (Ornithoptera), *Lep. Ind.* v, 1901–1903, p. 148, pl. 422, figs. 1, 1 *a*, ♂ ♀.

Ornithoptera rhadamanthus, *Boisduval* (*nec* rhadamantus, *Lucas*), *Spec. Gén. Lép.* i, 1836, p. 180, ♀; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 88; *Dist. Rhop. Malay.* 1885, pp. 326 & 327, fig. 106, ♀, pl. 27 *a*, fig. 5, ♂; *W.-M. & de N., J. A. S. B.* 1886, p. 373; *Elwes & de N. J. A. S. B.* 1886, p. 438; *Watson, Jour. Bomb. N. H. Soc.* vi, 1891, p. 53.

♂ ♀. Closely resembles *P. cerberus.* ♂ differs as follows:—*Upper side*, fore wing: the pale adnervular streaks more prominent, in some specimens extended into the cell along the outer half of the subcostal and of the median nervures. Hind wing: the cone-shaped terminal black markings in interspaces 2, 3, and 4 more or less broadly bordered on the inner side by a dusky area that is irrorated with blackish scales; the black on the costal margin narrower, not extended below vein 8. *Underside* similar to the upperside, but the dusky black borders to the cone-shaped marks in interspaces 2, 3, and 4 wanting. Antennæ, head, thorax, abdomen and abdominal fold as in *cerberus*, but the abdomen beneath with two rows of black spots.—In the ♀ the differences from *cerberus* are—Fore wing: the pale adnervular streaks very broad, very prominent and extended well into the cell. Hind wing: the basal third of the cell and of interspace 2 black, the middle portion of the latter yellow anteriorly, buffy-white posteriorly; the posterior half of the discal area between the postdiscal spots themselves and between them and the terminal cone-shaped markings more or less irrorated with blackish scales; lastly, the black in interspace 7 interrupted by an inner triangular and an outer small yellow spot. Antennæ, head, thorax and abdomen as in *cerberus*, but the abdomen beneath with two lateral and two median rows of black spots.

Exp. ♂ ♀ 119–188 mm. (4·71–7·4").

Hab. Sikhim; Assam; Burma; Tenasserim; extending to the east through the Shan States to Siam and China, and on the south to the Malay Peninsula.

487. **Papilio minos**, *Cramer, Pap. Exot.* iii, 1779, p. 4, pl. 195, fig. A; *Felder* (Ornithoptera), *Verh. zool.-bot. Ges. Wien*, xiv, 1864, pp. 291 & 334; *Aitken* (Ornithoptera), *Jour. Bomb. N. H. Soc.* ii, 1887, p. 35; *Davidson & Aitken* (Ornithoptera), *Jour. Bomb. N. H. Soc.* v, 1890, p. 361; *Rothsch.* (Troides) *Nov. Zool.* ii, 1895, p. 203; *Moore* (Ornithoptera), *Lep. Ind.* v, 1901–1903, p. 142, pl. 418, figs. 1, 1 *a*, 1 *b*, larva & pupa, ♂ ♀.

♂ ♀. Differs from *P. cerberus* as follows:—♂. Hindwing: the black along the dorsal and terminal margins both on upper and undersides much broader; on the upperside entirely filling interspace 1, on the underside with only a narrow streak of yellow at the angle between the median vein and vein 2; the cone-shaped black markings on the terminal margin shorter and broader; on the costal margin the black is narrower than in *cerberus*, barely extended below vein 8 except at the base and apex of the wing where it broadens; the abdomen is dull yellow above and below not shaded with black. ♀. Hind wing: the black on the costal margin as in *cerberus*, but there is always a large yellow spot at base of interspace 7; interspace 1 black, with a pale patch in the middle; the black terminal border broader, the inwardly extended cone-shaped markings prominent, those in interspaces 2 and 3 with pale buff lateral edgings, extended inwards to the postdiscal spots. In both ♂ and ♀ the hind wing on the upperside is clothed with soft, silky, long brownish-black hairs from base along the dorsal area.

Exp. ♂ ♀ 140–180 mm. (5·53–7·15").

Hab. Southern India: Bombay to Travancore.

Larva. Roughly cylindrical, tapers a little to each end, with two rows of fleshy processes somewhat curved forwards and a double row on each side that are much shorter. On the 2nd, 3rd and 4th segments an additional long pair between the dorsal and lateral rows. Head smooth and black; body of a uniform dark madder-brown, prettily lighted with a tinge of pink at the points of some of the fleshy processes; dorsal process on the 8th segment and a lateral pair on the 7th pinkish-white, with a band of the same colour uniting them.

Pupa. Suspended by the tail and a band that encircles it much nearer the head than is usual with *Papilio* pupæ. In form stout, flattened, dilated in the middle, with head and thorax thrown back. Head somewhat angular and tuberculated; two of the abdominal segments each with a prominent dorsal pair of pointed tubercles. Colour usually light brown, with a strongly contrasting saddle of old gold. (After *Davidson & Aitken.*)—Mr. T. A. Sealy (Proc. Ent. Soc. 1875, p. ix) states:—"The pupa possesses the power of making a curious noise like 'pha-pha'!, and makes it very loudly when touched; the noise is accompanied (perhaps produced) by a short contraction of the abdominal segments. I thought at first it was merely produced by the rubbing of one ring of the pupa-case against the next, but the sound did not resemble a mere frictional sound, it was more like the sound of a rush of air through small holes—'pha-pha.' I tried to produce it with a dead chrysalis but failed: the pupa sometimes contracted on being touched without making the noise, and appeared unable to make the noise until some time was given to allow it to recover its vigour." Messrs. Davidson and Aitken have also noticed this power in the pupa, but they speak of it "as a husky squeaking noise, produced apparently by friction of the abdominal rings."

488. **Papilio darsius**, *Gray, Cat. Lep. Ins. B. M.* i, 1852, p. 5; *Moore* (Ornithoptera), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 87, pl. 2, figs. 2, 2*a*, ♂ ♀, larva & pupa; *id.* (idem) *Lep. Ceyl.* i, 1881, p. 155, pl. 55, figs. 1, 1*a*, 1*b*, ♂ ♀, larva & pupa; *Rothschild* (Troides), *Nov. Zool.* ii, 1895, p. 203; *Moore* (Ornithoptera), *Lep. Ind.* v, 1901-1903, p. 140, pl. 418, figs. 1, larva & pupa, 1, 1*a*, ♂ ♀.

♂ ♀. This form is the darkest of the four of this group found within our limits. From *cerberus* it differs as follows:—♂. Fore wing: adnervular pale streaks not prominent on the upperside, more distinctly marked on the underside. Hind wing black, with a very broad discal slightly curved silky-yellow band or patch that extends beyond the cell from interspaces 2 to 7, and is composed of elongate outwardly emarginate yellow markings that are divided only by the black veins. In most specimens the inner margin of this band crosses the apex of the cell, but in many the cell is entirely black. Abdomen with some black markings beneath and a lateral row of black spots.—♀. Differs from *cerberus* ♀ in the much greater extent of the black on the hind wing. Interspace 1 with a pale dusky-white patch in the middle; interspace 7 with an inner and an outer yellow spot; cell entirely black or nearly so, sometimes, but rarely, with the yellow extended into the apex.

Exp. ♂ ♀ 165–175 mm. (6·6–6·95").

Hab. Ceylon.

Larva. "Cylindrical, dull purple-brown, with two dorsal rows and anterior and lateral rows of fleshy tubercles, those on the eighth segment and a streak from its base to lower end of seventh segment being pale pink; between the tubercles are dark brown streaks. Feeds on *Aristolochia*." (*Moore.*)

Pupa. "Pale purplish-ochreous, bent backwards anteriorly; thorax conical, the top flattened and its sides angled; wing-cases dilated and flattened laterally in the middle, their outer edge acute; two middle segments of abdomen with a dorsal pair of conical prominences." (*Moore.*)

Hector Group.

♂ ♀. Fore wing elongate, broader in ♀ than in ♂; costa widely arched, apex produced, rounded; termen oblique, straight, or in the ♂ slightly concave in the middle, in the ♀ convex; dorsum straight, about half length of costa; cell elongate, more than half length of wing; discocellulars nearly erect, upper not much shorter than the middle; veins 10 and 11 from the upper half of subcostal vein. Hind wing elongate, costa arched; termen scalloped, produced into a tail at vein 4; tail not so long as in the *Coon* Group, nor so distinctly and widely spatulate at the tip, in the typical form *hector* of even width to apex; dorsum long, straight; cell a little longer than half length of wing; veins 4 and 5 not approximate at base. Antennæ about half length of fore wing; club long, narrow, gradual; anal segment in ♂ without valves.

Key to the forms of the Hector *Group.*

A. ♂ ♀. Tail at apex of vein 4 in hind wing of even width, not spatulate at apex .... *P. hector*, p. 19.
B. ♂ ♀. Tail at apex of vein 4 in hind wing spatulate at apex.
  a Hind wing upperside: cell entirely black, rarely with a small spot of white at apex.

- *a'*. Hind wing upperside: three or four well-defined elongate white spots always present in the interspaces beyond apex of cell .... *P. aristolochiæ*, p. 20.
- *b'*. Hind wing upperside: only one well-defined elongate white spot in interspace 2 beyond apex of cell, others absent, or when present obscure, much suffused with black scales .... *P. aristolochiæ*, race *camorta*, p. 21.

b. Hind wing upperside: apical half or more of cell white.

- *a'*. Fore wing upperside: pale whitish streaks in apex of cell not extended to discocellulars .... *P. jophon*, p. 22.
- *b'*. Fore wing upperside: pale whitish streaks in apex of cell extended well up to discocellulars .... *P. jophon*, race *pandiyanus*, p. 22.

489. **Papilio hector**, *Linn. Syst. Nat.* ed. x, 1758, p. 459; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 93, pl. 2, figs. 4, 4 *a*, 4 *b*, larva & pupa; *id.* (Menelaides) *Lep. Ceyl.* i, 1881, p. 152, pl. 58, fig. 2; *Rothsch. Nov. Zool.* ii, 1895, p. 233; *Moore* (Tros), *Lep. Ind.* v, 1901–1903, p. 173, pl. 435, figs. 1, 1 *a*, 1 *b*, larva & pupa, ♂ ♀.

♂. *Upperside* black. Fore wing with a broad white interrupted band from the subcostal nervure opposite the origin of veins 10 and 11, extended obliquely to the tornus, and a second short preapical similar band; both bands composed of detached irregularly indented broad streaks in the interspaces. Hind wing with a discal posteriorly strongly curved series of seven crimson spots followed by a subterminal series of crimson lunules. Cilia black alternated with white. *Underside*: fore wing dull brownish black, hind wing black; markings as on the upperside, but the crimson spots and crescentic markings on the hind wing larger. Antennæ, thorax and abdomen above at base, black; head and rest of the abdomen bright crimson; beneath: the palpi, the sides of the thorax and abdomen crimson.—♀. Similar, the discal series of spots and subterminal lunules much duller, pale crimson irrorated with black scales; in some specimens the anterior spots and lunules almost white barely tinged with crimson; abdomen above with the black colour extended further towards the apex.

Exp. ♂ ♀ 88–120 mm. (3·49–4·75").

Hab. Bengal: Calcutta, Chaudernagore, Orissa, Chittagong; the southern half of peninsular India; Ceylon.

"*Larva.* Cylindrical, tapering slightly towards each end; rich dark purple-brown; with a subdorsal and two lateral rows of crimson fleshy cylindrical tubercles, the lowest row shortest, and an additional lateral tubercle on the third and fourth segments, a transverse row of four pinkish-white spots on the seventh and eighth segments; head and legs blackish." (*Moore.*)

"*Pupa.* Head truncate in front; thorax dorsally conical and laterally rounded; wing-cases posteriorly rounded and dilated; abdominal segments with four subdorsal short foliaceous protuberances; colour pale violaceous-ochraceous." (*Moore.*)

In the 'Entomologist's Monthly Magazine,' 1880, p. 276, Mr. R. S. Eaton notes that in Bombay this butterfly roosted in great numbers together.

On the Western Ghâts between Vingorla and Belgaum, where this butterfly occurred in some numbers, I also noted the habit they have of roosting in company on twigs of some thorny shrub, but I never saw more than a score or so together.

490. **Papilio aristolochiæ**, *Fabr. Syst. Ent.* 1775, p. 443; *Elwes & de Nicéville, J. A. S. B.* 1886, p. 435; *Davidson & Aitken, Journ. Bomb. N. H. Soc.* v, 1890, p. 362; *Rothsch. Nov. Zool.* ii, 1895, p. 245; *Moore* (Menelaides), *Lep. Ind.* v, 1901–1903, p. 178, pl. 441, figs. 1, 1 *a*–1 *d*, & pl. 442, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Papilio diphilus, *Esper, Aus. Schmett.* 1792, p. 156, pl. 40, fig. 2; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 94, pl. 2, figs. 5, 5 *a*, larva.

Menelaides ceylonica, *Moore, Lep. Ceyl.* i, 1881, p. 151, pl. 57, figs. 2, 2 *a*, 2 *b*, ♂, larva & pupa.

Race camorta.

Papilio aristolochiæ, *var.* camorta, *Moore, P. Z. S.* 1877, p. 592; *W.-M. & de N. J. A. S. B.* 1881, p. 237.

Menelaides camorta, *Moore, Lep. Ind.* v, 1901–1903, p. 182, pl. 443, figs. 1, 1 *a*–1 *c*, ♂ ♀.

Papilio aristolochiæ camorta, *Rothsch. Nov. Zool.* ii, 1895, p. 250.

♂. *Upperside* velvety black. Fore wing with well-marked pale adnervular streaks on the discal area that do not reach the terminal margin, the latter broadly velvety black; the streaks beyond end of cell extended inwards into its apex. Hind wing with elongate white discal markings in interspaces 2–5 beyond the cell.

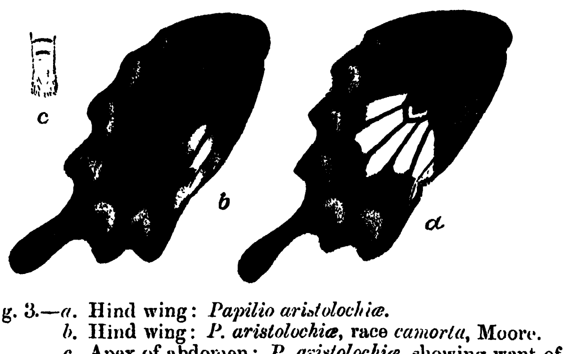

Fig. 3.—*a*. Hind wing: *Papilio aristolochiæ*.
b. Hind wing: *P. aristolochiæ*, race *camorta*, Moore.
c. Apex of abdomen: *P. aristolochiæ*, showing want of anal valves.

In dry-weather specimens these markings are very short and do not nearly reach the bases of the interspaces; beyond these a curved series of subterminal lunular markings in interspaces 1 to 7 dull crimson irrorated with black scales, the spot in interspace 1 large, irregular, diffuse, margined interiorly with white. *Underside*: ground-colour and markings similar, but the red subterminal spots on the hind wing much brighter, not irrorated with black scales, better defined, the anterior four subquadrate, the next two crescentic, sometimes quadrate also, the spot in interspace 1 triangular and pointed. Antennæ, thorax and abdomen above up to the preanal segment black; the head, sides of prothorax above, and of the whole of the thorax and abdomen beneath vermilion-red; anal segment vermilion-red.—♀ similar, differs from the ♂ only in the comparatively broader wings: this is most conspicuous in the fore wing.

Exp. ♂ ♀ 76–114 mm. (3–4·5").

Hab. N.W. India; Sikhim; W. & S. India; Ceylon; Assam; Burma; Tenasserim; extending on the west to China and Siam, and southwards to Malacca, Java and the Philippines.

Larva. "Adult 1¼ inch long. Stout, cylindrical and tuberculous. Gound-colour velvet-brown-black, dorsal line black; four longitudinal rows of fleshy tubercles bright red ...... seventh segment with a milk-white, jagged, lacerated band reaching right across the body and terminating at the third row of tubercles, the tubercles on that segment are white with the exception of the 3rd and 4th rows; head black; segmental incisions dark purple-brown; legs and abdomen beneath black; stigmates (*sic*) black; retractile tentacula orange. Feeds on *Aristolochia indica.* Habits slow."

Pupa. "Darkish brown, stout and broad, swollen at the sides, with four pairs of very prominent tubercles on the back of the abdomen." (*de la Chaumette as quoted by Moore.*)

In certain lights the wings of both ♂ and ♀ have a rich purple bloom on the upperside.—Var. *ceylonica*, Moore, has a white spot at the apex of the cell on the hind wing. Males of this butterfly vary greatly in size; quite tiny specimens, perfect miniatures of the normal form, are not uncommon throughout its range.

Race **camorta,** Moore (fig. 3*b*, hind wing), differs from the typical form as follows:—"The white spots of the hind wing small, only that between the lower median veins (veins 2 and 3) is clearly marked on the upperside, the two others standing before and behind the upper median nervule (vein 4) are sometimes entirely absent from the upperside, or when present are much suffused with black; below there is usually a spot within the apex of the cell." (*Rothschild.*)

Exp. ♂ ♀ 96–118 mm. (3·8–4·65").

Hab. The Nicobars. Mr. Gilbert Rogers sent it to me from the Central group, but not from Great Nicobar.

491. **Papilio jophon**, *Gray, Cat. Lep. Ins. Brit. Mus.* i, 1852, p. 10, pl. 4, fig. 4 ♀; *Moore* (Menelaides), *Lep. Ceyl.* i, 1881, p. 152, pl. 58, fig. 1 ♀; *Rothsch. Nov. Zool.* ii, 1895, p. 234; *Moore* (Menelaides), *Lep. Ind.* v, 1901-1903, p. 176, pl. 436, figs. 1, 1 *a*, 1 *b*, larva, ♂ ♀.

Race pandiyanus.

Papilio pandiyana, *Moore, Trans. Ent. Soc.* 1881, p. 313; *Ferguson, Journ. Bomb. N. H. Soc.* vi, 1891, p. 446.

Papilio pandiyanus, *Rothsch. Nov. Zool.* ii, 1895, p. 234; *Moore* (Menelaides), *Lep. Ind.* v, 1901-1903, p. 177, pl. 437, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂. *Upperside* black. Fore wing with three or four broad white streaks in cell and a variable number of similar somewhat broader streaks that are bifid along their apical half in the interspaces beyond; these streaks do not reach the terminal margin and become obsolete towards the costal margin of the wing. Hind wing: the apical half of the cell and short apically truncate streaks in the interspaces beyond white; these streaks broad. divided only by the black veins, followed by a subterminal curved series of crimson lunules irrorated with black scales. *Underside* similar, the markings more distinct and more sharply defined, the discal white streaks and the subterminal series of crimson spots each seven in number. Antennæ, head, thorax and abdomen above up to the preanal segment black; the head in front and beneath, the thorax at the sides and the apical half of the abdomen crimson, the last with one or two black lateral spots.—♀ similar; fore wing broader, the white and crimson markings larger and more conspicuous.

Exp. ♂ ♀ 118-128 mm. (4·64-5·2").

Hab. Ceylon. "Confined locally to the middle hill district" (*Manders*).

Larva. "Dark purple-black, with crimson-coloured pointed tubercles, two on 2nd segment, eight on each of 3rd and 6th, six on each of 8th to 10th, and four on 13th; seventh segment with a pale cream-coloured transverse band (interrupted on the dorsal line), including four tubercles of the same colour, below which on each side is a single crimson tubercle; on second segment is a band composed of four pale tubercular spots, from the centre of which can be protruded a pair of short blunt yellow tentacles." (*E. E. Green as quoted by Moore.*)

Race **pandiyanus**, Moore.—"Though closely allied to *P. jophon*, Gray, this species is constantly (as far as we know) different in pattern. The white colour of the fore wings is much more extended, especially in the apical region, but also more shaded with black scales; the internervular black streaks between the median nervules (veins 4-6) are much longer, the white linear markings in the cell reach the discocellular veinlets. On the hind wing the last discal white spot reaches mostly to the submedian nervure (vein 1), the anterior one is very large in the ♂, small or divided into two spots, or obliterated in the ♀ ......" (*Rothschild, t. c.*)

Exp. ♂ ♀ 102–114 mm. (4·02–4·5").

Hab. S. India: Nilgiri Hills; Travancore.

Coon Group.

♂ ♀. Wings very long and narrow. Fore wing: costa slightly arched, apex broadly rounded, termen ♂ straight, ♀ slightly convex, in both sexes very oblique; dorsum very short, less than half as long as the costa; cell long and narrow, considerably more than half length of wing; upper discocellular very little shorter than the middle; vein 10 from upper third, 11 from beyond the middle of subcostal. Hind wing with long spatulate tail; costa straight, short; termen very long, broadly scalloped; veins 4 and 5 approximate at base. Antennæ slightly less than half length of fore wing; club narrow, gradual. ♂ abdominal fold narrow, abrupt at apex; anal valves conspicuous, with a parting on the upperside.

Key to the forms of the Coon *Group.*

a. Hind wing upperside: spatulate portion of tail black.
  a'. Hind wing upperside: more than half apical portion of cell white .... *P. doubledayi*, p. 23.
  b'. Hind wing upperside: less than half apical portion of cell white .... } *P. doubledayi*, race *cacharensis*, p. 24.
b. Hind wing upperside: spatulate portion of tail red .... *P. rhodifer*, p. 24.

492. **Papilio doubledayi**, *Wallace, Trans. Linn. Soc.* xxv, 1865, p. 42, note; *Rothsch. Nov. Zool.* ii, 1895, p. 253; *Moore* (Losaria), *Lep. Ind.* v, 1901–1903, p. 184, pl. 438, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Race cacharensis.

Papilio cacharensis, *Butler, A. M. N. H.* (5) xvi, 1885, p. 344; *Moore* (Losaria), *Lep. Ind.* v, 1901–1903, p. 185, pl. 439, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Papilio doubledayi cacharensis, *Rothschild, Nov. Zool.* ii, 1895, p. 253.

♂. *Upperside* dull black, paler on the fore than on the hind wing. Fore wing with very conspicuous pale streaks, two in each interspace that extend well into the cell, but do not reach the termen, where the dull black ground-colour forms a broadish transverse band. Hind wing black, with in fresh specimens in certain lights a beautiful blue gloss; a central large white area composed of a white patch in the apical two-thirds of the cell and more or less elongate spots of varying breadth at base of interspaces 1–7, all these very distinctly divided by the broadly black-bordered veins, the spot in interspace 4 more or less obsolescent; lastly, a subterminal row of more or less crescentic white spots, the lower two shaded with crimson followed by a crimson tornal and a terminal similar but brighter spot at apex of vein 3, the spatulate tail black. *Underside* similar; the ground-colour duller.

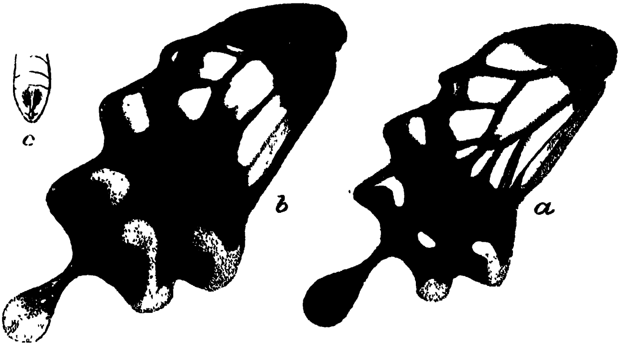

Fig. 4.—*a*. Hind wing: *P. doubledayi*.
b. Hind wing: *P. rhodifer*.
c. Anal valves of *Coon* group, open on upperside.

Hind wing: a white discal spot often in interspace below vein 1, the lower two spots of the terminal series entirely crimson. Antennæ, thorax and abdomen above up to the preanal segment black; head, palpi, sides of the thorax and rest of the abdomen crimson, the abdomen with black lateral spots.—♀ similar; fore wing paler. Hind wing: the central white markings larger, the subterminal spot in interspace 2 white, coalescent with the crimson tornal spot. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 118–134 mm. (4·65–5·25").

Hab. Burma; Tenasserim; extending to the Malay Peninsula.

Race **cacharensis**, Butler.—♂ ♀ smaller, with the ground-colour duller and the discal white spots on the hind wing conspicuously reduced in size. According to Rothschild the subterminal and terminal markings are also paler, often yellowish red. "Head, sides of breast and abdomen of a yellowish-red instead of vermilion-red" (*Rothschild, t. c.*).

Exp. ♂ ♀ 102–112 mm. (4·02–4·41").

Hab. Recorded so far only from Cachar.

493. **Papilio rhodifer**, *Butler, Ent. Month. Mag.* xiii, 1876, p. 57; *Rothsch. Nov. Zool.* ii, 1895, p. 254; *Moore* (Losaria), *Lep. Ind.* v, 1901–1903, p. 186, pl. 440, figs. 1, 1 *a*, ♂ ♀.

♂ differs from *P. doubledayi* as follows:—Ground-colour a rich velvety-black, much darker than in *doubledayi*; on the fore wing the pale streaks extend only into the apex of the cell. On the hind wing the medial white markings are much shorter, the spots at base of interspaces 4 and 5 and generally the spot in interspace 7 absent; the subterminal and terminal vermilion spots are much larger, and the tail is vermilion on its apical spatulate portion. Antennæ, head, thorax and abdomen as in *doubledayi*, but the head entirely vermilion-red. ♀ closely resembles the ♂, fore wing broader, red markings on hind wing more crimson than vermilion-red, often dull and irrorated slightly with black scales; medial white markings more extensive, the white mark in interspace 1 extends well below vein 1.

Exp. ♂ ♀ 126–134 mm. (5–5·28″).

Hab. The Andamans.

Nox Group.

♂ ♀. Fore wing elongate; costa slightly arched, twice length of dorsum, apex rounded; termen straight in ♂, slightly convex in ♀, dorsum straight; cell long, well over half length of wing, veins 10 and 11 close together from apical half of subcostal. Hind wing elongate; costa short, slightly curved; termen long, convex, broadly scalloped; dorsum with the abdominal fold in the ♂ closed, straight; veins 4 and 5 closely approximate or from a point. ♂ sex-mark, abdominal fold very large in two out of the three Indian forms, cut square on its lower margin, its dorsal margin fringed with long hairs, beneath the fold a mass of specialized scent-scales; anal valves short, convex. Antennæ a little less than half length of fore wing; club long, narrow, gradual in both sexes.

Key to the forms of the Nox *Group.*

a. Hind wing upperside: uniform, without white subterminal markings.

  a′. ♂ ♂ with abdominal fold on hind wing square at its lower margin. ♀ ♀ with a broad crimson lateral band on abdomen. Exp. 128–136 mm. .... *P. varuna*, race *astorion*, p. 25.

  b′. ♂ ♂ with abdominal fold on hind wing rounded, not square, at the tornal angle. ♀ ♀ with a broad white lateral band on abdomen. Exp. 144–162 mm. .... *P. aidoneus*, p. 26.

b. Hind wing upperside: with white subterminal markings .... *P. zaleucus*, p. 27.

494. **Papilio varuna**, *White, Entomologist*, i, (March) 1842, p. 280, ♀.

Race astorion.

Papilio astorion, *Westw. A. M. N. H.* ix, 1842, p. 37; *Elwes, Trans. Ent. Soc.* 1888, p. 422; *Moore* (Pangerana), *Lep. Ind.* v, 1901–1903, p. 153, pl. 423, figs. 1, 1*a*, 1*b*, ♂ ♀.

Papilio varuna astorion, *Rothsch. Nov. Zool.* ii, 1895, p. 260.

♂. *Upperside* rich velvety blue-black. Fore wing: outwardly towards the terminal margin and the whole of the hind wing except the dorsal area have in certain lights a rich dark purple bloom, in others a very dark green; dorsal area and the whole inner side of the sexual fold opaque brownish black; outer half of fore wing with pale adnervular streaks more or less prominent. *Underside* similar; fore wing with the adnervular pale streaks broader, more prominent, extended further inwards well up to the terminal margin. Hind wing: ground-colour more uniform blue-black than on the upperside. Antennæ, head, thorax and abdomen black; the head in front, on the sides and beneath, the sides of the thorax and of the abdomen rich crimson; beneath, the thorax and abdomen black, the latter with lateral black spots in addition on its crimson sides.—♀. *Upperside* dull black. Fore wing with the pale greyish-green streaks very broad and prominent, especially in interspaces 1 and 2, the streaks extend also into the cell. Hind wing more uniform, with a dark dull blue, in some lights dark green, bloom. *Underside* similar, the streaks on the fore wing broader and paler; hind wing as on the upperside, more uniform, duller, opaque. Antennæ and thorax black, abdomen dull brownish black, head crimson; beneath as in the ♂, but the crimson less bright, especially on the sides of the abdomen and without the lateral spots on the latter.

Exp. ♂ ♀ 88–136 mm. (3·5–5·38″).

Hab. Sikhim; Bhutan; Assam; Upper Burma; Tenasserim.

In Sikhim, according to Elwes and de Nicéville, it occurs from quite low elevations in the Terai up to 7000 feet. Its almost uniform dark colour renders it inconspicuous in the jungle, and it is therefore difficult to account for its being further protected by a disagreeable smell and probably taste. Wood-Mason has recorded that the females have a strong and disgustingly rank musky odour.

495. **Papilio aidoneus**, *Doubleday, A. M. N. H.* xvi, 1845, p. 178, ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 423; *Rothsch. Nov. Zool.* ii, 1895, p. 257; *Moore* (Pangerana), *Lep. Ind.* v, 1901–1903, p. 154, pl. 424, figs. 1, 1*a*, ♂ ♀.

♂ ♀. Resembles *P. varuna* race *astorion*, but differs as follows:—Cell of fore wing proportionately not quite so long; abdominal fold to the hind wing in ♂ not so broad, its lower margin not square, rounded; the specialized scales within the fold white, with an edging of pink. ♀ larger. *Upperside*: ground-colour olivaceous-brown, never black; abdomen with a broad white, not crimson, lateral stripe.

Exp. ♂ ♀ 112–162 mm. (4·4–6·33″).

Hab. Sikhim (2000–3000 feet, *fide* Elwes); Bhutan; Assam: the Naga Hills; Upper Burma: the Shan States.

496. **Papilio zaleucus,** *Hewitson, Exot. Butt.* iii, 1865, Pap. pl. 7, figs. 24, 25, ♂ ♀; *Rothsch. Nov. Zool.* ii, 1895, p. 261; *Moore* (Pangerana), *Lep. Ind.* v, 1901–1903, p. 155, pl. 425, figs. 1, 1*a*–1*c*, ♂ ♀.

♂. *Upperside* velvety black, with a deep bluish bloom on the hind wing. Fore wing uniform with generally pale internervular streaks on the terminal half. Hind wing with two or three large subterminal, outwardly emarginate, white spots in interspaces 2 and 3 or 2, 3 and 4; inside the abdominal fold brown, with a purple gloss in some specimens, the specialized scent-scales or hairs greyish. *Underside*: fore wing similar, the pale internervular streaks broader, more prominent, extended into the cell. Hind wing: similar to the upperside, the ground-colour purplish-opaque, with a small white spot sometimes in interspace 3. Antennæ, head in front, thorax posteriorly and abdomen black; the prothorax with the sides crimson, above clothed with a few black hairs; beneath, the palpi, sides of the thorax and abdomen crimson.

♀. *Upperside*: fore wing black, uniform, the internervular streaks very broad, greenish, giving a green appearance to the whole wing. Hind wing: ground-colour rich indigo-green, a very broad white subterminal band composed of elongate spots in interspaces 1 to 5, the spot in interspace 1 nearly reaches the margin, only separated from it by a narrow black line, the spots in interspaces 2–5 outwardly deeply emarginate. *Underside*: fore wing as on the upperside but with not so green a tint. Hind wing: ground-colour opaque black, the broad white subterminal band as on the upperside, but generally with diffuse small black spots on the white in interspaces 3, 4 and 5; an additional much smaller white spot near apex of interspace 6. Antennæ, head, thorax and abdomen as in the male, but the palpi crimson; the abdomen with lateral black spots and black transverse bars beneath on the crimson.

Exp. ♂ ♀ 84–127 mm. (3·3–5″).

Hab. Upper Burma: the Shan States; Tenasserim; Siam.

LATREILLEI GROUP.

Fore wing elongate, costal margin arched, more than twice as long as dorsal margin; apex broadly rounded; termen very oblique, dorsum straight; cell elongate, broad, more than half the length of the wing; upper discocellular only a little shorter than middle; veins 10 and 11 from apical half of subcostal and along the greater part of their length very close to vein 12, vein 9 from upper apex of cell. Hind wing very long and narrow; termen broadly scalloped, produced at vein 4 into a broad spatulate tail; cell very narrow; basal portion of subcostal between veins 7 and 8 equal to middle discocellular nervule lying between veins 4 and 5. Antennæ not half length of fore wing. Abdominal fold in ♂ not so broad as in the *Nox* Group, on its inner side with dense cottony androconia. Anal valves in ♂ normal.

Key to the forms of the Latreillei *Group.*

A. Hind wing upperside: a terminal or subterminal red or pinkish-red spot on tail.	
a. Hind wing upperside: discal or subterminal markings present.	
a′. Hind wing upperside: an elongate white spot near base of interspace 3.	
a^{2}. Hind wing upperside: no white spot near base of interspace 5	*P. latreillei*, p. 28.
b^{2}. Hind wing upperside: a prominent quadrate white spot near base of interspace 5	*P. polla*, p. 30
b′. Hind wing upperside: no white spot near base of interspace 3.	
a^{2}. Hind wing upperside: no red or white spot or marking in interspace 6.	
a^{3}. Hind wing upperside: a large quadrate white spot in interspace 5 at base.	
a^{4}. Hind wing upperside: postdiscal lunule in interspace 4, some shade of red.	
a^{5}. Hind wing upperside: an elongate white spot at base of interspace 4	*P. philoxenus*, p. 31.
b^{5}. Hind wing upperside: no white spot at base of interspace 4 ..	*P. philoxenus*, var. *polyeuctes*, p. 31.
b^{4}. Hind wing upperside: postdiscal lunule in interspace 4 always white	*P. philoxenus*, var. *dasarada*, p. 31.
b^{3}. Hind wing upperside: a narrow transverse white spot in middle, not at base of interspace 5	*P. philoxenus*, race *lama*, p. 32
b^{2}. Hind wing upperside: a lunular conspicuous white spot in interspace 6 .	*P. ravana*, p. 33.
b. Hind wing upperside: uniform, without discal or subterminal markings	*P. crassipes*, p. 34.
B. Hind wing upperside: tail uniform, without subterminal or terminal spot or marking.	
a. Hind wing upperside: no discal white spots at bases of interspaces 3 and 4.	
a′. Hind wing upperside: a crimson subterminal lunule in interspaces 2, 3 and 4, and a large quadrate white spot in interspaces 5 and 6	*P. nevilli*, p. 33.
b′. Hind wing upperside: a pinkish-white subterminal lunule in interspaces 2 to 6, no quadrate white spot in interspaces 5 and 6	*P. alcinous*, race *pembertoni*, p. 34.
b. Hind wing upperside: a series of discal white spots at bases of interspaces 1 to 5 .	*P. adamsoni*, p. 29.

497. **Papilio latreillei,** *Donovan, Nat. Repos.* ii, 1826, pl. 140; *Elwes, Trans. Ent. Soc.* 1888, p. 425; *Rothsch. Nov. Zool.* ii, 1895, p. 261; *Moore* (Byasa), *Lep. Ind.* v, 1901–1903, p. 165, pl. 430, figs. 1, 1*a*–1*c*, ♂ ♀.

Papilio minereus, *Gray, Zool. Misc.* 1831, p. 32; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 97.

♂. *Upperside* dull brownish black. Fore wing with streaks in cell, the internervular streaks and the veins velvety black. Hind wing: ground-colour more uniform to apex of cell, beyond this interspaces 2, 3 and 4 with broad elongate white spots, the spot in interspace 2 slightly tinged outwardly with crimson; sometimes a white crimson-tinted spot also in interspace 1; a subterminal series of crimson lunules in interspaces 2 to 5, that in 5 generally more or less white; lastly, a crimson spot at apex of vein 3 and on apex of tail. *Underside* similar, ground-colour much paler; markings of the hind wing as on the upperside, but slightly larger, the crimson spots brighter; in many specimens a small discal adnervular spot in interspace 5, and a subterminal small white lunule in interspace 6 also present; the crimson-tinted discal spot in interspace 1 always present. Antennæ dark brownish black, head and front of the prothorax crimson, the rest of the body above black; beneath, the palpi, thorax and abdomen crimson, the middle of the thorax and of the abdomen with black markings.—♀. Similar, slightly paler; the white and crimson markings on the hind wing on both upper and undersides similar but larger; there is generally also a discal adnervular spot in interspace 5. Antennæ, head, thorax and abdomen as in the ♂.

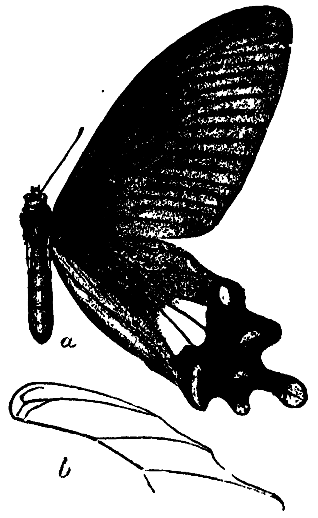

Fig. 5.—*a. Papilio latreillei*, ⅔. *b.* Venation of anterior portion of hind wing.

Exp. ♂ ♀ 120–130 mm. (4·73–5·13″).

Hab. Nepal; Sikhim; Assam.

This form apparently keeps to a higher elevation than its close ally, *P. philoxenus*. Mr. Elwes says it is not uncommon between 7000 and 9000 feet in Sikhim, and there is no record of its occurrence at a lower elevation than 7000 feet.

498. **Papilio adamsoni**, *Grose-Smith, A. M. N. H.* (5) xviii, 1886, p. 149, ♂; *id. & Kirby, Rhop. Exot.* i, 1888, Pap. p. 11, pl. 5, figs. 3 & 4; *Rothsch. Nov. Zool.* ii, 1895, p. 262; *Moore* (Byasa), *Lep. Ind.* v, 1901-1903, p. 167, pl. 431, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Papilio (Byasa) minereoides, *Elwes & de N. J. A. S. B.* 1887, p. 435, pl. 20, figs. 2, 2*b* ♂, 3 ♀.

♂ ♀. Closely resembles *P. latreillei*, but can be distinguished as follows:—♂. *Upperside*: ground-colour darker, not uniform, distinctly darker on the basal half of the fore wing. Hind wing: ground-colour on the basal side of the discal white markings not paler than the ground-colour beyond these; an additional white elongate spot, sometimes transversely divided into two, in interspace 5; a subterminal series of only three lunules in interspaces 2, 3 and 4 respectively, that in 4 white, no terminal crimson spot at vein 3 or on tail. *Underside* similar to the upperside, but the ground-colour paler and more opaque, the white markings more or less tinged with crimson and a well-defined subterminal white spot always present in interspace 6. Antennæ, head, thorax and abdomen much as in *P. latreillei*.—♀. Similar to the ♂, but the ground-colour paler, the white markings on the hind wing larger, the subterminal lunules more or less white.

Exp. ♂ ♀ 92–115 mm. (3·65–4·13″).

Hab. Upper Burma: the Shan States; Tenasserim.

499. **Papilio polla**, *de Nicéville* (Papilio-Byasa), *J. A. S. B.* 1897, p. 565, pl. 4, fig. 28 ♂; *Moore* (Byasa), *Lep. Ind.* v, 1901-1903, p. 166, pl. 429, fig. 2 ♂.

♂. Very closely resembles *P. latreillei* ♂, but judging by a single specimen the fore wing is proportionately rather narrower, the termen more oblique, the tornus more rounded. The markings on the hind wing differ as follows:—the discal white patch composed of four elongate spots in interspaces 2–4, that in interspace 4 very broad, filling the interspace between the middle of veins 5 and 6; subterminal series of lunules larger than in *latreillei*, and all vermilion-red, not crimson, both on the upper and undersides; cilia between tornus and apex of vein 3, apex of tail and cilia at apex of vein 5 vermilion-red. On the underside, the spot of the discal patch in interspace 1 is vermilion-red, and the red lunule of the subterminal series in interspace 2 is produced to the vermilion-red terminal edging below it. Antennæ, head, thorax and abdomen as in *P. latreillei*.—♀. "Appears to differ only from the male on the upperside of the hind wing in the white patch, which is continued posteriorly to the abdominal margin or nearly so and does not extend into the end of the cell." (*de Nicéville, t. c.*)

Exp. ♂ 131 mm. (5·15″).

Hab. Upper Burma: Bernardmyo, 6000 feet, Northern Shan States, N. Chin Hills.

This seems to be a very rare insect, at any rate within British territory, only single specimens seem to have been taken so far. Of these, one, a ♂, now in the British Museum, I took at over 5000 feet elevation, on the shoulder of the hillside on which were built the barracks for the troops at Bernardmyo, in the Ruby Mines district, Upper Burma.

500. **Papilio philoxenus**, *Gray, Zool. Misc.* 1831, p. 32; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 96; *Rothsch. Nov. Zool.* ii, 1895, p. 264; *Moore* (Byasa), *Lep. Ind.* v, 1901-1903, p. 159, pl. 426, figs. 1, 1*a*-1*d*, larva & pupa, ♂ ♀.

Papilio polyeuctes, *Doubleday in Gray's Zool. Misc.* 1842, p. 74.

Papilio dasarada, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 96; *id.* (Byasa) *Lep. Ind.* v, 1901-1903, p. 161, pl. 427, figs. 1, 1*a*, 1*b*, ♂ ♀.

Papilio philoxenus *ab.* polyeuctes, *Rothsch. Nov. Zool.* ii, 1895, p. 265.

Papilio philoxenus *ab.* dasarada, *Rothsch. Nov. Zool.* ii, 1895, p. 266.

Race lama.

Papilio lama, *Oberthür, Études d'Ent.* ii, 1876, p. 15, pl. 3, fig. 1 ♂.

Papilio philoxenus lama, *Rothsch. Nov. Zool.* ii, 1895, p. 266.

♂. *Upperside* velvety black. Fore wing with broad pale adnervular streaks that do not extend to the terminal margin and only slightly into the cell. Hind wing: a very large white quadrate spot in interspace 5 and usually a white spot in the interspaces above or below or in both; a series of postdiscal crimson or red lunules in interspaces 2, 3 and 4, followed by similarly coloured admarginal spots in interspaces 2 and 3 and at apex of tail, the lunule in interspace 2 nearly always, and that in interspace 3 very often, joined to the admarginal spots. *Underside* similar; ground-colour more opaque, dull, not velvety; the adnervular streaks on the fore wing very broad. Hind wing as on the upperside, but an additional elongate crimson spot near base of interspace 3 and a broad irregular transverse crimson bar below it in interspaces 1 and 2; the other markings somewhat larger than on the upperside, the white margins often tinged with red along their edges. Antennæ black, head and thorax anteriorly crimson; rest of thorax and abdomen black; beneath: the palpi, thorax and abdomen crimson, the abdomen with a line of black spots along each side.—♀ similar; ground-colour on both upper and undersides somewhat duller, not velvety; markings on the upperside much duller crimson, often nearly white and much irrorated with black scales; the white quadrate spot in interspace 5 generally larger than in the ♂, the white spots in the interspaces above and below it more frequently present.

Exp. ♂ ♀ 126-157 mm. (4·96-6·2").

Hab. The Himalayas from Kashmir to Sikhim; Bhutan; Assam; Upper Burma; Tenasserim, extending to the Malay Peninsula.

A very variable form both in size and in the colour and disposition of the markings on the hind wing.

Var. *polyeuctes*, Doubleday.—The ♂ without any trace of a white spot above or below the large quadrate white patch in interspace 5, the postdiscal and terminal markings all crimson or vermilion-red.

Var. *dasarada*, Moore, typically differs from typical *philoxenus* as follows:—Larger, with broader tails to the hind wing. *Upperside*: the adnervular pale streaks on the fore wing very broad and prominent, extended well into the cell and nearly to the base of the wing; at the apex they extend outward to the terminal margin; markings on the hind wing larger in proportion to the size of the insects; only the posterior markings more or less reddish-pink, the rest white, strongly irrorated with black scales. *Underside*: markings similar to those of the typical form, but only the spots in interspaces 1, 2 and 3 and on the tail in the hind wing reddish pink, the others white, some slightly tinged along the outer edge with pink. This aberration is variable and unstable and grades into the typical form. The two fly together at the same season and in the same locality.

Larva. "2½ inches long; pale purple-brown; head and legs shining black; head small, corneous, sparsely covered with black hairs; 2nd segment with two short tubercles on each side and a nuchal, transverse, flattened, corneous, tentacular sheath in front; 3rd, 4th, 5th and 6th segments each with eight short tubercles, four on each side, the subdorsal series longest; 7th, 8th, 9th and 10th segments each with six tubercles, and 11th, 12th and 13th segments each with four shorter tubercles; each tubercle is red at the apex and purple-black streaked at the base; intervening space between the tubercles with a transverse and a dorsal series of paler purple-black spots; these latter markings all with pale borders; 7th and 8th segments each with a lateral, short, broad, oblique white band." (*Moore.*)

Pupa. "Reddish-ochreous, broad laterally; head broad and slightly cleft in front; thorax convex above and beneath, angular at the sides; wing-cases dilated laterally; abdominal segments with lateral foliaceous appendages." (*Moore.*)

"Occurs in Sikhim up to 8000 feet and is not uncommon in the clearings in April and May. It, especially the female, has a very strong disagreeable musky odour, which perseveres long after the insect is dead and dry." (*de Nicéville MS.*)

In Tenasserim I got *P. philoxenus* at elevations of 2000 to 4000 feet on the Dawnat range.

Race **lama**, Oberthür.—"Smaller than *philoxenus*, Gray; the wings are shorter and proportionately broader; the red hairs of the front of the head are rather densely intermingled with black ones; the prothorax is less red; the abdomen is black underneath, with the edges of the segments red; the large white patch on the hind wings between the discoidal veins and the spot at the apex of the tail are liable to obliteration. . . . . In the shape of the hind wings this subspecies is less variable than *philoxenus*. The males have sometimes the paler ground-colour of the females." (*Rothschild.*)

Exp. ♂ ♀ 119–129 mm. (4·69–5·10").

Hab. A ♀ recorded from Kashmir (*Rothschild*). Originally described from Western China.

I have followed Rothschild in treating this form as a race of *philoxenus*, but in the Leech collection now in the British Museum there is a very long series of *lama*, many of which seem to me identical with specimens of *philoxenus* from Sikhim. The measurements given above are taken from the Leech collection specimens.

501. **Papilio ravana,** *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 96; *Elwes, Trans. Ent. Soc.* 1888, p. 423; *Rothsch. Nov. Zool.* ii, 1895, p. 262; *Moore* (Byasa), *Lep. Ind.* v, 1901–1903, p. 163, pl. 428, figs. 1, 1*a*–1*c*, ♂ ♀.

♂. *Upperside* brownish black. Fore wing with velvety-black internervular streaks that are extended into the cell in many specimens; veins black. Hind wing: a subterminal series of white markings more or less tinged with crimson, the markings in interspaces 2, 3 and 4 lunular, in 5 and 6 elongate rectangular, in 7 a minute spot, the white rectangular marking in interspace 5 conspicuously larger than the others; a spot on each side of vein 4 on the tail crimson. *Underside* similar; ground-colour very much paler; on the hind wing an additional pale crimson spot more towards the base of interspaces 1 and 2. Antennæ, thorax and abdomen black; head crimson; beneath: the palpi, sides of the thorax, and abdomen crimson, the palpi with a mixture of black hairs, the abdomen at the base and on the sides spotted with black.—♀ similar; ground-colour brown, very much paler than in the ♂; internervular, velvety-black streaks on fore wing very narrow. Hind wing: ground-colour of outer half beyond discal markings black; markings similar to those in the ♂, but larger and purer white on the upperside; in addition a series of white discal spots near base of interspaces 1, 2, 3 and 4, that in interspace 1 tinged with crimson; on the underside the markings are similar, but both the discal and the subterminal posterior spots are more strongly tinged with crimson. Antennæ, head, thorax and abdomen much as in the ♂.

Exp. ♂ ♀ 110–118 mm. (4·35–4·67″).

Hab. N.W. Himalayas: recorded from Kashmir; Kulu; Mussoorie; Kumaon.

502. **Papilio nevilli,** *Wood-Mason, A. M. N. H.* (5) ix, 1882, p. 105; *Rothsch. Nov. Zool.* ii, 1895, p. 263; *Moore* (Byasa), *Lep. Ind.* v, 1901–1903, p. 164, pl. 429, fig. 1 ♂.

Papilio chentsong, *Oberthür, Études d'Ent.* xi, 1886, p. 13, pl. 1, fig. 1 ♂; *Leech, Butt. China*, ii, 1893, p. 543.

♂ ♀. Resembles *P. ravana*, Moore, but is smaller, with the markings also proportionately smaller. ♂ differs as follows:—the subterminal series of lunules on the hind wing crimson or vermilion-red, never white or partly white as in *ravana*; sexual abdominal fold within white, not blackish-brown; the subterminal red lunule in interspace 3 very often wanting. ♀ resembles its own ♂ rather than the ♀ of *P. ravana*, but the white rectangular markings in interspaces 5 and 6 are whiter. From *P. ravana* ♀ it differs in the complete absence of the white discal spots in interspaces 1, 2, 3, and 4. In both sexes the tail is black without any red spot.

Exp. ♂ ♀ 80–84 mm. (3·18–3·32″).

Hab. Within our limits recorded from Cachar; extends to W. China.

503. **Papilio crassipes,** *Oberthür, Etudes d'Ent.* xvii, 1893, p. 2, pl. 4, figs. 38, 38*a*; *Rothsch. Nov. Zool.* ii, 1895, p. 262; *Moore* (Byasa), *Lep. Ind.* v, 1901–1903, p. 171, pl. 434, fig. 2 ♂.

♂. "*Upperside*: fore wing dark fuliginous black, with black veins, a longitudinal streak between the veins and streaks within the cell. Hind wing very narrow anteriorly and much prolonged posteriorly, exterior margin broadly scalloped, tail very broad and short; abdominal margin with a very long folded lappet, which when opened displays a lengthened greyish-white woolly androconial patch; colour dull greyish black, with two upper marginal and two subanal lunules, tip of the tail very obscure dusky red. *Underside*: fore wing paler. Hind wing dull black, with the two upper and lower marginal lunules, an irregular-shaped anal lunule, and the tail tip bright crimson. Thorax and abdomen above black; front of head and thorax and abdomen beneath crimson; abdomen beneath with black segmental bands; hind tibiæ very thick; antennæ and legs black.

"*Exp.* ♂ 4½ inches." (*Moore.*)

Hab. Recorded within our limits from the Southern Shan States, Upper Burma.

Originally described from Tonkin.

504. **Papilio alcinous,** *Klug, Neue Schmett. Ins.-Samml. Berlin*, 1836, pl. 1, ♂ ♀.

Race pembertoni.

Byasa pembertoni, *Moore, Lep. Ind.* v, 1901–1903, p. 170, pl. 434, figs. 1, 1*a*, ♂ ♀.

♂. *Upperside* fuliginous black. Fore wing with broad pale adnervular streaks extending from near the base to the terminal margin, present also in the cell. Hind wing, cell and interspaces to near the termen entirely pale, veins black; a subterminal series of pink-white broad lunules in interspaces 2–6; tail immaculate. *Underside* similar, ground-colour paler, an additional subterminal pink-white lunule in interspace 1 that extends over the vein into interspace 2, and another very small one in interspace 7. Antennæ, head, thorax and abdomen black; beneath: the palpi, sides of the thorax, and the abdomen pinkish red, the palpi with an admixture of black hairs, the abdomen with transverse black edgings of hair to the segments.—♀. "*Upperside* pale olivescent greyish-fuliginous. Fore wing with black veins and streaks. Hind wing with the submarginal pale flesh-coloured lunules slightly larger than in the ♂, and with their surrounding marginal borders dull dark black. *Underside* slightly paler than upperside. Hind wing with six submarginal pale flesh-coloured lunules and a similarly coloured broad anal lunule as in ♂, the surrounding marginal border duller black. Thorax and abdomen above fuliginous black; collar, front of head, sides of thorax beneath, and abdomen beneath pale crimson, segmental bands on abdomen beneath black; antennæ and legs black." (*Moore.*)

Exp. ♂ 102–108 mm. (4·03–4·28″).

Hab. Bhutan.

Machaon Group.

♂ ♀. Sexes alike in the shape of the wings and in the pattern of colours. Fore wing: costa very slightly arched, curved near apex; apex well marked, obtuse; termen straight, very slightly oblique; tornus broadly rounded; dorsum straight; cell longer than half length of fore wing, upper and middle discocellulars subequal. Hind wing: costa very slightly arched, long; termen curved, scalloped, with or without a short, generally slender tail at apex of vein 4; tornus lobed; dorsum straight or slightly concave; cell comparatively short, upper discocellular longer than middle. Antennæ not quite half length of fore wing, club somewhat massive but gradual; abdomen with the anal valves prominent.

Key to the forms of the Machaon *Group.*

a. Hind wing with tails.
  a'. Fore wing upperside: base of cell uniform dusky black without longitudinal streaks of creamy white.
    a². Hind wing upperside: ochraceous red, tornal spot not separated by a black line from blue lunule above it .... *P. machaon*, race *sphyrus*, p. 36.
    b². Hind wing upperside: ochraceous red, tornal spot separated by a black line from the blue lunule above it .... *P. machaon*, race *sikhimensis*, p. 36.
  b'. Fore wing upperside: base of cell not uniform dusky black, traversed longitudinally by four more or less broken slender creamy-white lines .... *P. xuthus*, p. 38.
b. Hind wing without tails.
  a'. Hind wing upperside: creamy-yellow band that crosses wing comparatively narrow so as to leave at least a third of the cell at apex black.............................. *P. demoleus*, p. 39.
  b'. Hind wing upperside: creamy-yellow band that crosses wing comparatively broad so as to leave barely a fourth of the cell at apex black.............................. *P. demoleus*, race *malayanus*, p. 39.

505. **Papilio machaon,** *Linn. Syst. Nat.* ed. x, 1758, p. 462.

Race sphyrus.

Papilio sphyrus, *Hübner, Eur. Schmett.* i, 1818-1827, pl. 155, figs. 775 & 776.
Papilio machaon, *var.* asiatica, *Ménétriés, Enumer. Corp. Anim. Mus. Petr.* i, 1855, p. 70.
Papilio asiatica, *Moore, P. Z. S.* 1882, p. 258; *id. Lep. Ind.* vi, 1903, p. 39, pl. 481, figs. 1, 1 *a*-1 *c*, larva & pupa, ♂ ♀, & pl. 482, fig. 1, ♂.
Papilio ladakensis, *Moore, J. A. S. B.* 1884, p. 46; *id. Lep. Ind.* vi, 1903, p. 43, pl. 482, fig. 2 ♂.
Papilio machaon sphyrus, *Rothsch. Nov. Zool.* ii, 1895, p. 275; *de Nicéville, Jour. Bomb. N. H. Soc.* xi, 1898, p. 592.

Race sikhimensis.

Papilio sikkimensis, *Moore, J. A. S. B.* 1884, p. 47; *id. Lep. Ind.* vi, 1903, p. 44, pl. 482, figs. 3, 3 *a*, ♂ ♀.
Papilio machaon sikkimensis, *Rothsch. Nov. Zool.* ii, 1895, p. 276.

I have followed Rothschild in treating the form of *machaon* found in the N.W. Himalayas as a race, and identical with var. *sphyrus*, Hübner = var. *asiatica*, Ménétriés, but as a matter of fact the variation in a wide-ranging insect like *machaon* is so great that the description below taken from Simla specimens might well stand for individuals procured in the fens of Cambridge or on the Continent.

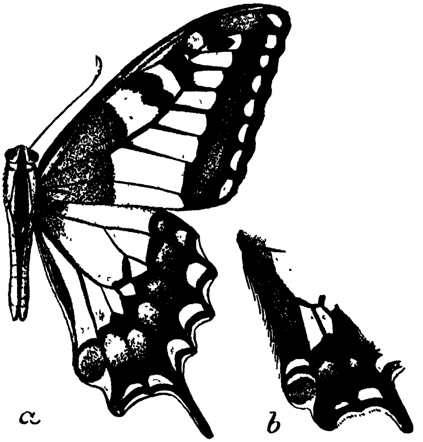

Fig. 6.—*a. Papilio machaon*, race *sphyrus*.
b. Tornal portion, hind wing of *P. machaon*, Linn., race *sikhimensis*, Moore.

♂ ♀. *Upperside*: fore wing dull black irrorated on its basal third with yellow scales, which also form a transverse diffuse postdiscal band and a diffuse preapical spot; a broad band across the middle of the cell, another narrower similar band at its apex, a narrow streak at base of interspace 9, a quadrate spot near base of interspace 8, a transverse discal series of broad streaks that decrease in length towards the costa in interspaces 1 *a* to 7, and a transverse subterminal series of crescentic spots, cream-yellow; the streak in interspace 7 with a superposed irregular diamond-shaped black spot. Hind wing: the cell and broad streaks beyond, divided only by the black veins and a narrow black edging to the discocellulars, cream-yellow. These streaks are variable in length and occupy fully three-fourths of the dorsal margin and of interspace 1, they decrease suddenly and considerably in interspaces 2 to 5 and lengthen again in the anterior interspaces. Terminal half of the wing black, with a superposed postdiscal transverse series of diffuse blue spots and a subterminal series of cream-coloured lunules. Inner margin of the black area irregularly zigzag, an ochraceous-red spot at the tornal angle below the blue postdiscal spot in interspace 1, the base and dorsal margin of wing shaded with black irrorated with yellow scales; cilia of both fore and hind wing prominently yellow in the interspaces. The depth of the tint of the cream-coloured portions on both fore and hind wings is very variable as is the width of the black areas, especially on the hind wing, also the size of the blue postdiscal spots on the same wing. *Underside* pale cream-colour. Fore wing: two transverse short bands across cell, another beyond its apex where it borders the discocellulars, a prominent broad transverse discal band and a terminal broad line, black; the bands across the cell and beyond its apex more or less diffuse, the discal band with its middle very broadly cream-coloured from interspaces 2 to 7 and thickly sprinkled with black scales. Hind wing: the veins and a terminal broad line black, the black on the upperside shows through as an irregular transverse sinuous bluish discal band thickly sprinkled with black scales and is bordered interiorly and exteriorly by broken transverse black lines, the inner line margined on the outer side by a diffuse blue scaling and on the inner side in interspaces 3 and 4 by an ochraceous-red spot; tornal spot and cilia of both fore and hind wings as on the upperside. Antennæ black; head, thorax and abdomen cream-colour; head, thorax and abdomen above with a black medial streak, narrow in the ♂ very broad in the ♀; abdomen beneath with narrow lateral ill-defined black lines.

Exp. ♂ ♀ 80–110 mm. (3·14–4·33″).

Hab. Within our limits the N.W. Himalayas from Chitral to Nepal; extending to Central Asia, and North and West to South Europe and North Africa.

Larva. "Newly born. Head large, shining, black and hirsute. Body spined, the spines longest on the thorax . . . . all the spines thickly branched and much swollen at the base. A dorsal white patch on the 7th and 8th segments (on which the spines are also white); the rest of the surface ochreous-green. . . . True legs shining black, the claspers dark coloured with light tips." (*Harford.*) Adult: spineless; ground-colour very variable, from yellowish green to brilliant green with black transverse markings and lateral orange-yellow spots, the white patch on the 7th and 8th segments much reduced. Food-plants, Fennel (*Fœniculum vulgare*) and also the flowers not the leaves of Hemlock (*Conium maculatum*).

Pupa. Varies in colour from ochraceous grey to pale green. Angular and tuberculated; head bifid; thorax humped with its posterior portion flattened.

Race **sikhimensis**, Moore (fig. 6 *b*).—This, the **dark** eastern form of *machaon*, is very similar to race *sphyrus* and on its western borders merges into that form. It can, however, be distinguished by its general dark tone of colouring on the upperside; on the fore wing the discal series of cream-coloured streaks are much shorter and conspicuously separated from one another by the broad black edgings to the veins; on the hind wing the dorsal margin is very broadly bordered with black which in interspace 1 all but merges into the black terminal area, the inner margin of this black area extends straight across the wing and is only slightly curved, not zigzag; lastly the tornal ochraceous-red spot is *always* separated from the blue lunule above by a narrow interval of black. *Underside* similar to that of *sphyrus* but darker.

Exp. ♂ ♀ 68–78 mm. (2·68–3·1″).

Hab. The Eastern Himalayas: Sikhim; Bhutan; the Chumbi Valley: Burma; Northern and Southern Shan States; extending to Western China and Tibet.

506. **Papilio xuthus,** *Linn. Syst. Nat.* ed. 1767, p. 751; *Pryer, Rhop. Nihon.* 1886, p. 3, pl. 1, figs. 2, 2 *a*, 2 *b*; *Moore in Anderson's Zool. Res. Yunan Exp.* ii, 1878, p. 923.
Papilio xanthus, *Rothsch. Nov. Zool.* ii, 1895, p. 278; *Moore, Lep. Ind.* vi, 1903, p. 45.

♂ ♀. *Upperside* black with cream-coloured markings as follows:—Fore wing: cell with four or five slender somewhat broken streaks from base that extend for two-thirds of its length, followed by a short transverse bar and another similar bar along the discocellulars; a streak from base not extended beyond the disc in interspaces 1 *a* and 1, the streak in the latter angulated downwards below origin of vein 2, its apical portion double; a discal series of elongate subtriangular spots that decrease in size towards the costa, in interspaces 2 to 7, the spots in 6 and 7 with an oval black medial spot generally dividing them in two; a spot near base of interspace 8 followed by a diffuse small patch of similarly coloured scales; finally a subterminal complete series of lunules. In the ♀ between the discal and subterminal series of cream-coloured markings there is a complete postdiscal series of transverse somewhat diffuse pale spots. Hind wing: a broad streak from base nearly filling the cell, a streak in interspace 1 extended for three-fourths of its length: shorter streaks in the interspaces beyond the cell; that in interspace 7 interrupted by a large black spot (this spot in the ♀ paler); a postdiscal series of diffuse spots, cream-coloured (except the tornal spot which is blue) in the ♂, blue in the ♀, followed by a subterminal series of cream-coloured lunules, the lunule at the tornal angle centred with black in the ♂, in the ♀ also centred with black but with its upper half ochraceous; the lunule in interspace 8 with its upper horn elongate, produced down the tail. *Underside*: fore wing similar, the cream-coloured markings broader, the postdiscal series of transverse spots present also in the ♂; in both sexes that and the subterminal series form continuous bands. Hind wing: the cream-coloured markings very broad on the basal half of the wing, separated only by the black veins; a discal irregular black band composed of large black spots between the veins, these spots are traversed on their inner halves by a line of diffuse blue and cream-coloured scaling, and in some of the interspaces margined inwardly and outwardly by a shading of ochraceous; the subterminal series as on the upperside but much larger and formed of somewhat irregular quadrate spots.

Exp. ♂ ♀ 102–120 mm. (4·04–4·75″).

Hab. Within our limits, Upper Burma: Bhamo and Northern Shan States; extends through Western China to Corea and Japan.

507. **Papilio demoleus,** *Linn. Syst. Nat.* ed. x, 1758, p. 464; *Rothsch. Nov. Zool.* ii, 1895, p. 279; *Moore* (Orpheides), *Lep. Ind.* v, 1901–1903, p. 234, pl. 466, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.
Papilio erithonius, *Cramer, Pap. Exot.* iii, 1782, p. 67, pl. 232, figs. A, B; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 105, pl. 3, fig. 6, 6 *a*, larva & pupa; *id.* (Orpheides) *Lep. Ceyl.* i, 1857, p. 147, pl. 61, figs. 2, 2 *a*, 2 *b*, ♀, larva & pupa.

Race malayanus.

Papilio erithonius, *loc. form* malayanus, *Wallace, Trans. Linn. Soc.* xxv, 1865, p. 59.
Papilio demoleus malayanus, *Rothsch. Nov. Zool.* ii, 1895, p. 281.
Orpheides malayanus, *Moore, Jour. Linn. Soc.* xxi, 1886, p. 50; *id. Lep. Ind.* v, 1901–1903, p. 240.

♂ ♀. *Upperside* black. Fore wing: base below cell and basal half of latter so irrorated with yellow scales as to form more or less complete transverse dotted lines, two outwardly oblique yellow spots in cell and a curved spot at its upper apex; a spot at base and another beyond it in interspace 8; a discal transverse series of cream-yellow spots irregular in arrangement and size extends from interspace 1 *a* to 8; the series interrupted in interspace 5 and the spot in interspace 7 double; this is followed by a sinuous postdiscal series of spots and an admarginal terminal series of smaller spots. In many specimens between the discal and postdiscal series the black ground-colour is irrorated with yellowish scales. Hind wing: base and an edging that decreases in width along the dorsal margin irrorated with yellow scales; followed by a broad medial yellow irregular band, a sinuous postdiscal series of outwardly emarginate yellow spots and a terminal series of smaller similarly coloured spots as on the fore wing. The inner margin of the medial band is curved inwards, the outer margin is very irregular and uneven; in the cell the band does not reach the apex, but beyond the cell

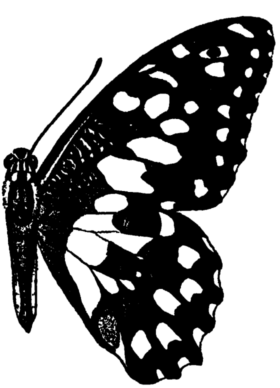
Fig. 7.—*Papilio demoleus.*

there are one or more cream-yellow spots, and the black ground-colour is irrorated with yellowish scales; finally at the tornal angle there is an oval ochraceous-red spot emarginate on its inner side in the ♀ and in both sexes surmounted by a blue lunule; while in interspace 7 between the medial band and the postdiscal spot there is a large ocellus-like spot of the black ground-colour more or less irrorated with blue scales. *Underside*: ground-colour similar, the cream-coloured markings paler and conspicuously larger. The latter differ from those on the upperside as follows:—Fore wing: basal half of cell and base of wing below it with cream-coloured streaks that coalesce at base; irregular ochraceous spots in interspaces 5 to 8 and the discal series of spots complete not interrupted in interspace 5. Hind wing: the black at base of wing and along the dorsal margin centred largely with pale cream-colour; the ocellus in interspace 7, the apex of the cell and the black ground-colour between the medial band and postdiscal markings in interspaces 2–6 centred with ochraceous, margined with blue. Antennæ dark reddish brown, touched with ochraceous on the innerside towards the club; head, thorax and abdomen dusky black, the head and thorax anteriorly streaked with cream-yellow; beneath: the palpi, thorax and abdomen cream-yellow with lateral longitudinal black lines on the last.

Exp. ♂ ♀ 80–100 mm. (3·18–3·95").

Hab. Kashmir to Ceylon; Assam to Upper Burma, up to a moderate elevation; extending to Persia and eastwards to China and Formosa.

Larva. After 1st moult tuberculate, brown with a milk-white V-shaped mark on the 6th–9th segments, and white lateral streaks anterior and posterior to the V-shaped markings. These make the larva look for all the world like the droppings of some bird, and it is evidently to some extent protected thereby, for while young the larva feeds and rests openly on the upperside of the leaf. Full-grown the larva is brilliant rich green, velvety and without tubercles, the sides and some of the segments dorsally marked with black, yellowish white, and rich brown; head, legs and prolegs reddish brown. The food-plant varies, the "bael" (*Ægle*), "ber" (*Zizyphus*), lime, orange and pumelo are the chief.

Pupa. Green or yellowish-brown according to surroundings.

Race **malayanus**, Wallace.—A slightly differentiated and not very constant race; distinguishable by the width (measured in the cell) of the median cream-coloured band on the hind wing. In typical *demoleus* the apical third of the cell is black on the upperside; in the present race the cream-coloured median band is broader, and leaves less than a fourth of the cell at apex black.

Exp. ♂ ♀ as in the typical form.

Hab. Lower Burma; Tenasserim; Malay Peninsula. Many specimens from Assam to Lower Burma are intermediate as regards the width of the median transverse band on the hind wing.

Helenus Group.

♂ ♀. Fore wing broadly triangular; costa widely arched; apex moderately pointed but not acute; termen straight, very slightly concave; tornus broadly rounded; dorsum slightly sinuous, nearly straight, cell long, well over half length of wing; *outer half of wing on the upperside in male more or less densely hairy so as to conceal the scaling*. Hind wing: costa arched, termen scalloped, with at apex of vein 4 a broad spatulate tail; cell comparatively short; upper discocellular markedly longer than middle discocellular.

Key to the forms of the Helenus *group.*

A. Hind wing with an upper discal white or creamy-white patch; no continuous white band across.
  a. Hind wing upperside: upper discal white patch extends from interspaces 5 to 7.
    a'. Hind wing underside: without a series of discal blue lunules.
      a². Fore wing underside: pale grey internervular streaks anteriorly elongate that reach up to apex of cell .... *P. helenus*, p. 41.
      b². Fore wing underside: pale grey internervular streaks anteriorly not elongate nor extended to apex of cell.......... *P. helenus*, race *daksha*, p. 42.
    b'. Hind wing underside: with a series of discal blue lunules .... *P. helenus*, race *mooreanus*, p. 43.
  b. Hind wing upperside: upper discal white patch extended from interspaces 4 to 7 .... *P. iswara*, p. 43.
B. Hind wing with a greenish- or yellowish-white continuous band across.
  a. This band commencing from above middle of dorsal margin......................... *P. demolion*, p. 44.
  b. This band commencing from middle of dorsal margin or from a little below it .... *P. demolion*, race *liomedon*, p. 45.

508. **Papilio helenus**, *Linn. Syst. Nat.* ed. x, 1758, p. 459; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 101; *Moore* (Charus), *Jour. Linn. Soc.* xxi, 1889, p. 51; *Rothsch. Nov. Zool.* ii, 1895, p. 284; *Moore*, (Charus), *Lep. Ind.* v, 1901–1903, p. 208, pl. 454, figs. 1 1 *a*–1 *c*, ♂ ♀.

Race daksha.

Papilio helenus, *Moore* (nec *Linn.*), *Cat. Lep. Mus. E. I. C.* i, 1857, pl. 3, figs. 2, 2 *a*, larva & pupa; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 367.

Papilio (Charus) daksha, *Hampson, J. A. S. B.* 1888, p. 363; *Moore* (Charus), *Lep. Ind.* v, 1901–1903, p. 210, pl. 455, figs. 1, 1 *a*, 1 *b*, larva & pupa, ♂ ♀.

Papilio helenus daksha, *Rothsch. Nov. Zool.* ii, 1895, p. 286.

Race mooreanus.

Charus helenus, *Moore* (nec *Linn.*), *Lep. Ceyl.* i, 1881, p. 149, pl. 58, fig. 3.

Papilio helenus mooreanus, *Rothsch. Nov. Zool.* ii, 1895, p. 286.
Charus mooreanus, *Moore, Lep. Ind.* v, 1901-1903, p. 211.

♂ ♀. *Upperside* brownish black to rich velvety black. Fore wing: four slender lines in cell and outer internervular hairy streaks that vary in width brown, these latter give in many specimens a golden-brown appearance in certain lights to the terminal half of the wing. Hind wing: a more or less quadrate white spot in interspace 7, with two more elongate similar spots in the interspaces below that form a conspicuous upper discal white patch, the outer margin of which is zigzag; this is followed by a series of admarginal more or less imperfect claret-red rings in interspaces 1 to 5 that enclose large intense black oval spots. The number of these rings is very variable, the tornal one is always present, the rest partially or completely obsolescent. Cilia black alternated with white. *Underside*: duller, more opaque black. Fore wing similar to the upperside but the cellular and internervular streaks formed of scales, not hairs, greyish white in colour and more clearly defined, the latter anteriorly do not reach the terminal margin but extend to the apex of the cell. Hind wing: markings similar to those on the upperside, but the upper spot of the discal white patch generally crescentic in shape, the whole patch generally smaller and the spots that compose it divided by the black veins; the admarginal series of rings are dull red and only the tornal and the ring in interspace 2 are more or less complete, the rest of the series is reduced to a curved subterminal line of lunules that extends from interspaces 3 to 7; in addition there is an inner broad red lunular spot in interspace 2 in continuation of the inner portion of the red ring at the tornal angle; both the lunule and the inner portion of the tornal ring traversed by a line of white scales. Antennæ, head, thorax and abdomen black; the abdomen beneath touched with greyish white along the sides.

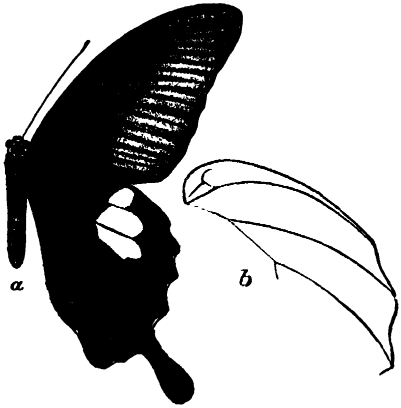

Fig. 8.—*a. Papilio helenus*, Linn. ⅔.
b. Venation of anterior portion of hind wing.

Exp. ♂ ♀ 100-140 mm. (3·96-5·52").

Hab. The Himalayas at no great elevation from Mussoorie to Sikhim; the hills of Assam, Burma and Tenasserim, extending to Siam, China and the Malay Peninsula.

Race **daksha,** Hampson.—Similar to the typical form, from which it can be distinguished as follows:—♂ ♀. *Underside* of fore wing: the grey internervular streaks much shorter, formed into a broad transverse discal series which widens considerably towards the costa but posteriorly stops far short of the terminal margin. Hind wing: the upper discal white patch considerably larger than in *P. helenus* both on the upper and undersides; the upper spot in interspace 7, which on the underside of the hind wing in *P. helenus* is generally crescent-shaped, in the present race is always much longer. Below the white patch there are also in some specimens two red crescent-shaped marks in addition to those that are found in *P. helenus*.

Exp. ♂ ♀ 118–140 mm. (4·26–5·52″).

Hab. Southern India; the Nilgiris; Malabar; Travancore.

Messrs. Davidson and Aitken have published the following notes about the larva and pupa:—"We got one larva of this on the Tirphal (*Xanthoxylon rhetsa* ?), a horribly thorny tree leafless in the dry season, the berries of which are used by the natives in curry. The fourth and fifth segments were even more tumid than in *P. polymnestor*, forming a broad and high hump, nearly flat on the top, and bounded before and behind by rugged ridges of a whitish or pale grey colour chequered with fine brown lines. The anterior ridge ended in a large black and white ocellus on each side, and the whole aspect of the creature from the front had a strikingly grim likeness to the head of some beast or reptile, with heavy brow and angry eyes. In other respects no separate description of this larva is necessary. The pupa was distinguishable from that of *P. polymnestor*, chiefly by the two projecting points on the head being somewhat curved upwards."

Race **mooreanus**, Rothschild.—"Grey streaks on the underside of the fore wings as in *P. helenus daksha*, Hamps.; the Naples-yellow scales of the upperside of the fore wings form conspicuous internervular streaks in the outer region; the white area of the hind wings smaller (♂) beneath than above; on the underside of the hind wings there is a complete series of seven subdiscal blue lunules of which the three anterior stand at the outer edge of the white discal marks, and of which the two posterior are situated within the anal and subanal rufous spots."

Exp. ♂ ♀ 124–146 mm. (4·9–5·76″).

Hab. Ceylon.

509. **Papilio iswara,** *White, Entom.* i, 1842, p. 280; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 101; *Rothsch. Nov. Zool.* ii, 1895, p. 288; *Moore* (Charus), *Lep. Ind.* v, 1901–1903, p. 212, pl. 456, figs. 1, 1 *a*, ♂ ♀.

♂ ♀. Very closely resembles *P. helenus*, but differs as follows:—*Upperside*: the upper discal creamy-white spot on the hind wing is much larger and extends into interspace 4; in the ♀ and in some ♂ specimens also there is some obscure, diffuse, white scaling below that again. *Underside*: fore wing differs from fore wing of typical *helenus* in the shortness of the internervular grey streaks, which are somewhat as in the fore wing of the race *daksha*. Hind wing: upper discal white patch smaller than on the upperside and distinctly divided into four by the black veins that cross it; incomplete broad orange-red admarginal rings that enclose large black spots at the tornal angle and at apex of interspace 2, the former connected with the discal white patch by a series of obscure bluish lunules; the subterminal series of orange-red lunules so conspicuous in typical *helenus* entirely absent. Antennæ, head, thorax and abdomen as in *helenus*.

Exp. ♂ ♀ 127–145 mm. (5-5·72").

Hab. Malay Peninsula; extending up into the southern islands of the Mergui Archipelago, and southwards to Sumatra and Borneo.

510. **Papilio demolion**, *Cramer, Pap. Exot.* i, 1776, p. 140, pl. 89, figs. A, B; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 105, pl. 3, figs. 5, 5 *a*, larva & pupa; *Rothsch. Nov. Zool.* ii, 1895, p. 282; *Moore* (Araminta), *Lep. Ind.* v, 1901-1903, p. 219, pl. 460, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Race liomedon.

Papilio liomedon, *Moore, P. Z. S.* 1874, p. 575; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 367, pl. D, figs. 1–3, larva & pupa; *Moore* (Araminta), *Lep. Ind.* v, 1901–1903, p. 221, pl. 461, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Papilio demolion liomedon, *Rothsch. Nov. Zool.* ii, 1895, p. 283.

♂ ♀. *Upperside* brownish black. Fore and hind wings crossed by a broad prominent oblique pale greenish or yellowish-white band that commences just before the middle of the dorsal margin of the hind wing, crosses over on to the fore wing and is continued as a series of spots that diminish in size in the upper interspaces to the apex of that wing; on the hind wing this is followed by a subterminal series of similarly-coloured lunules. *Underside* fuliginous black, the transverse band that crosses the wings as on the upperside. Fore wing: cell with a series of four slender longitudinal pale lines from base; the veins also picked out with pale lines; on the veins that run to the terminal margin these lines are conspicuous only at the apices; there are besides short similar lines between the veins that extend to the terminal margin. Hind wing: the interspaces beyond the transverse medial greenish-white band marked with broad jet-black streaks up to the subterminal line of greenish-white lunules; these streaks medially interrupted by a transverse line of blue scales and succeeded in interspaces 1 and 7 by preapical ochraceous-yellow spots; terminal margin beyond the line of lunules black. Antennæ, head, thorax and abdomen fuliginous black; beneath, the palpi and abdomen greenish white, the thorax dark grey.

Exp. ♂ ♀ 95–112 mm. (3·76-4·42").

Hab. Tenasserim; extending to Siam; the Malay Peninsula; Sumatra; Java.

Larva. "Similar to that of *P. erithonius* (i. e. *Papilio demoleus*). Anterior segments scutellated, furnished with two tentacular processes on the 2nd segment and two short fleshy processes on the 9th and anal segments." (*Moore.*)

Pupa. "Curved abruptly backwards; head bifid; thorax with a lengthened curved acute thoracic process." (*Moore.*)

Race **liomedon**, Moore.—A slightly differentiated race distinguishable chiefly by the pale greenish-yellow band that crosses the wings starting from the middle and not from just before the middle of the dorsal margin of the hind wing, also this band is composed entirely of separate spots on the fore wing.

Exp. ♂ ♀ 110–115 mm. (4·34–4·54″).

Hab. Southern India.

A very interesting account of the life-history of this insect is given by Messrs. Davidson and Aitken (*l. c.*). One of these gentlemen watched a female, *P. liomedon*, laying its eggs on a tender shoot of a small jungle tree or shrub (*Acronychia laurifolia*). There were "ten eggs, laid one on top of the other." Of the caterpillars which emerged five days after the eggs were laid, "five passed successfully through all dangers and became beautiful specimens, one female and four males. (This is one of the butterflies of which we rarely find females.) All through their lives these larvæ continued gregarious, dispersing occasionally to feed, but always returning to rest side by side on the upper surface of a leaf. The following dates may be interesting. Eggs laid 2nd August, hatched 7th August; skins cast (and eaten) 12th August; again 17th August; again 20th to 22nd August. The most advanced cast its skin again on the 28th August, became a pupa on the 2nd of September, and emerged on the 15th of September. The others followed within two days. At first the larvæ were of an oily yellow colour and bore many pairs of spiny points, but these disappeared with age and after the last moult there were only the short fleshy processes on the 2nd and last segment which characterise the group, and one additional curved pair on the ninth segment.

"The colour after the last moult was a clear slaty-blue, changing eventually to a greenish tint, with light brown markings very much the same as those which characterise the rest of the group. The pupa was more abruptly bent back from the middle of the thorax than that of *P. erithonius* (i. e. *P. demoleus*) and adorned on the thorax with a sword-shaped horn, fully three-eighths of an inch long, and always bent either to the right or the left. The colour was brown or green and yellow according to situation."

Memnon Group.

♂. Fore wing: costa widely arched; apex somewhat produced but broadly rounded; termen slightly concave below apex, then oblique; tornus rounded; dorsum slightly sinuous; cell more than half length of wing. Hind wing comparatively short and broad; costa and termen united, formed into a bold continuous curve, the latter deeply sinuous; dorsum straight; cell comparatively short; upper discocellular much longer than the middle discocellular. Antennæ slender, not quite half length of fore wing; club slight, gradual.

♀. Occasionally in one form, always in the other forms, with a broad spatulate tail at apex of vein 4.

Key to the forms of the Memnon *group.*

♂ ♂.

- *a*. Hind wing upperside: ground-colour throughout dark indigo-blue black.
  - *a'*. Hind wing upperside: without any distinct continuous transverse medial blue band, but with internervular streaks of blue scales, sometimes entirely absent, wing then uniform blue-black.
    - *a*². Such streaks absent or present, when present not heavily marked, not outwardly pointed, extended nearly to terminal margin ...... *P. memnon*, race *agenor*, [p. 47.
    - *b*². Such streaks always present, heavily marked, pointed outwardly, and well short of terminal margin.... *P. polymnestoroides*, p. 52.
  - *b'*. Hind wing upperside: with a prominent continuous transverse broad medial blue band .... *P. mayo*, p. 49.
- *b*. Hind wing upperside: ground-colour basal third black, remainder more or less pale blue.
  - *a'*. Hind wing upperside: outer portion entirely pale blue with black markings............................ *P. polymnestor*, p. 50.
  - *b'*. Hind wing upperside: outer portion pale blue with a very strong yellow tint .... *P. polymnestor*, race [*parinda*, p. 51.

♀ ♀.

- *a*. Hind wing tailed.
  - *a'*. Tail uniform black, without a red spot near apex .... *P. memnon*, race *agenor* (tailed form), p. 49.
  - *b'*. Tail not uniform black, with a red spot near apex .... *P. mayo*, p. 49.

b. Hind wing not tailed.
  a'. Hind wing: with a large black-centred red tornal spot on upperside ...... *P. memnon*, race *agenor* (tailless forms), p. 48.
  b'. Hind wing: without a red tornal spot on upperside.
    *a*². Hind wing upperside: with a medial series of outwardly pointed internervular blue streaks as in male .. *P. polymnestoroides*, p. 52.
    *b*². Hind wing: upperside with ground-colour and markings as in respective males .... { *P. polymnestor*, p. 50. *P. polymnestor*, race [*parinda*, p. 51.

511. **Papilio memnon,** *Linn. Syst. Nat.* ed. x, 1758, p. 460.

Race agenor.

Papilio agenor, *Linn. Syst. Nat.* ed. x, 1758, p. 460, ♀; *Hübner* (Iliades), *Verz. bek. Schmett.* p. 89; *Aurivillius, Kongl. Sv. Vet.-Akad. Handl.* xix (5) 1882, p. 18; *Moore* (Iliades), *Lep. Ind.* v, 1901-1903, p. 194, pls. 446–449.

Papilio androgeos, *Cramer, Pap. Exot.* i, 1776, p. 142, pl. 91, figs. A, B, ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 428.

Papilio memnon agenor, *Rothsch. Nov. Zool.* ii, 1895, p. 316, ♂ ♀.

Race **agenor,** Linn.—An extremely variable polymorphic form, described originally from a tailless ♀. The common form of the ♂ is the one figured as *androgeos* by Cramer. The tailed form of the ♀ seems to be more common than the tailless forms, but both tailed and tailless forms of the ♀ occur throughout its range.

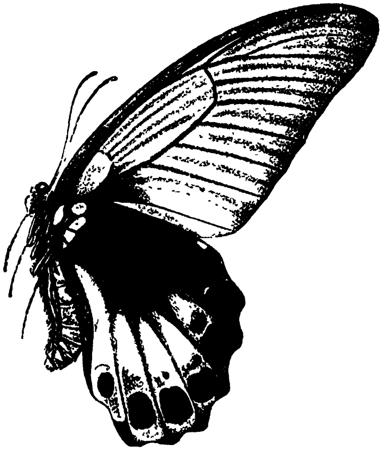

Fig. 9.—*Papilio memnon*, race *agenor*, Linn., ♀. ⅔.

♂. *First form.* — *Upperside*: deep indigo-blue black; fore wing with or without a short dark red streak at base of subcostal cell; both fore and hind wings with more or less well-marked silvery-blue adnervular streaks that do not reach the terminal margin; these are most prominent on the hind wing where they extend into the apex of the cell; on the fore wing they are confined to the outer half and become obsolescent towards the costa. *Underside*: fore wing ground-colour dull black; the adnervular silvery-blue streaks as on the upperside but much broader, more prominent and extended well into the cell; a broad dark red patch at base of the latter. Hind wing dull opaque black with broad velvety-blacker streaks in the interspaces, each broadened towards the apex but not extended to the terminal margin; in interspaces 1–4 the apical portion of these streaks is separate and forms a large oval spot; base of wing and tornal area red, on the former traversed by the black veins, on the latter very variable in extent, more or less formed into rings round the subterminal black spots in interspaces 1 and 2, sometimes in 3 also; finally a postdiscal shading of blue scales more or less lunular in each interspace. Antennæ, head, thorax and abdomen black; the abdomen brownish beneath.

♂. *Second form* = ab. *depelchini*, Robbe.—*Upperside*: the adnervular blue scaled streaks more or less obsolescent, sometimes completely obsolescent on the fore wing, or obsolescent on the fore and strongly marked on the hind wing. *Underside*: fore wing like that of the typical form; hind wing with red markings at the tornal angle that extend to interspace 4; one or more postdiscal red lunules also in the anterior interspaces. I have seen specimens of this form from Sikhim, Assam and strange to say, from Great Nicobar also.

♂. *Third form* = ab. *primigenius*, Rothsch.—"*Upperside*: hind wing in the anal region with a series of four (Khasia Hills specimen, *type*), or two (Sikhim specimen), black spots wholly encircled with almost white scaling; bluish-grey streaks much whiter than in the usual form of the ♂. *Underside*: hind wing with an anal and three submarginal complete grey rings, the anal ring and a grey subdiscal lunule between the two lower median nervules (veins 2 and 3) tinged with red at their basal sides; in the Khasia Hill specimen there is a second grey lunule before the middle median nervule (vein 3) and in each of the three anterior cellules stands, close to the white marginal fringe, a grey spot, which is partly joined to a submarginal indistinct lunule so as to form an incomplete submarginal grey ring; the subdiscal series of blue spots is incomplete; in the Sikhim specimen these spots are rather well-defined." (*Rothschild, t. c.*)

♀. *First form*: tailless.—*Upperside*: fore wing, the basal third of the cell vermilion-red touched outwardly with white, a speck of vermilion-red at base of interspace 2, the basal third of interspaces 1 and 2 velvety black, remainder of the wing grey with the veins and medial internervular streaks dusky black. Hind wing: basal half of wing indigo-blue black; terminal half white, the white traversed by black veins, broadly bordered on each side by black; terminal margin also somewhat broadly black; interspaces 1 to 7 with a series of large velvety-black oblong spots on the white, those in the interspaces 1 to 3 encircled by a diffuse shading of reddish or ochreous scales, those in the anterior interspaces confluent outwardly with the black terminal margin. In some specimens the white does not extend above interspace 5, the basal and anterior portions of the wing are black with a dusting of bluish scales. In others the black terminal margin is very narrow and the subterminal spots distinct from it up to interspace 6. *Underside* very similar to the upperside, with similar markings; in a few specimens with an inner postdiscal row of dark diffuse spots on the white of the hind wing; the base of this wing red, the terminal margin with a grey edging traversed by the black veins. Antennæ, head, thorax and abdomen brownish black.

♀. *Second form*: tailless = ab. *butlerianus*, Rothsch.—*Upperside*: fore wing as in the typical form but paler, often with a whitish patch posteriorly. Hind wing indigo-green, streaks of blue scaling as in the ♂; interspace 1 whitish, outwardly merged into a reddish shading round a subterminal velvety-black spot. *Underside*: fore wing as in the typical ♀ but paler. Hind wing as in many of the males, but with a broad white streak nearly from base in interspace 1.

♀. *Third form*: tailed = ab. *alcanor*, Cramer.—*Upperside*, fore wing: basal third of cell and a minute spot at base of interspace 2 vermilion-red; a velvety-black patch at bases of interspaces 1 and 2; rest of the wing brown or greyish-brown with black veins and internervular black streaks. Hind wing black, apical third to apical half of cell (ab. *distantianus*, Rothsch.) and broad streaks at bases of interspaces 1 to 6 white, the latter tinged outwardly with vermilion-red and very variable in length, sometimes entirely absent in one or more of the interspaces mentioned; lastly a terminal series of vermilion-red admarginal spots that decrease in size from interspaces 1 to 7; the red in interspace 1 lengthened, occupying half the interspace but it is generally interrupted by a large subterminal black spot; cilia black alternated with white in the interspaces. *Underside* similar, ground-colour of fore wing paler; base of hind wing red, terminal spots vermilion-red, markings paler, the anterior admarginal spots ochraceous to greyish-white. Antennæ, head, thorax and a line on the abdomen above brownish black, a broad band on the sides of the abdomen bright ochraceous; beneath, the palpi, thorax and abdomen dusky black.

Exp. ♂ ♀ 120–166 mm. (4·74–6·56").

Hab. India (excluding the North-West, Central India, and Ceylon); Assam; Burma; Tenasserim; extending to the Malay Peninsula; China and Japan.

Found alike in the hills and the plains. In the Himalayas, Southern India, Assam, Burma, and Tenasserim up to 5000 ft. Both sexes are entirely inodorous.

512. **Papilio mayo**, *Atkinson*, *P. Z. S.* 1873, p. 736, pl. 63, fig. 1; *W.-M. & de N. J. A. S. B.* 1880, p. 237, & 1881, p. 252; *Rothsch. Nov. Zool.* ii, 1895, p. 322; *Moore* (Ileades), *Lep. Ind.* v, 1901-1903, p. 201, pl. 450, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Papilio charicles, *Hewitson*, *A. M. N. H.* (4) xiv, 1874, p. 356 ♀; *W.-M. & de N. J. A. S. B.* 1880, p. 237.

♂. *Upperside* rich velvety black. Fore wing with a subterminal series of greenish-yellow irrorated internervular streaks, sometimes more or less obsolescent. Hind wing: a very broad discal band pale blue, composed of broad outwardly more or less emarginate streaks in interspaces 1 to 7; cilia: fore wing black, hind wing black alternated with white in the interspaces. *Underside* opaque blue-black. Fore wing with a dark red streak at base and the subterminal internervular streaks as on the the upperside but grey and more prominent. Hind wing with 4 or 5 small patches of dark red at base, a complete dark red ocellus in interspaces 1 and 2, and indistinct subterminal very variable markings of red in the other interspaces, sometimes formed into half ocelli in interspaces 3 and 4; within this line of markings there is an incomplete discal lunular series of mixed red and blue scaling. Antennæ, head, thorax and abdomen black.— ♀ closely resembles the tailed form of the ♀ of *P. memnon*, race *agenor*, but on the disc of the fore wing the internervular broad pale streaks are nearly white, and on the hind wing the white streaks in the interspaces beyond and outside the cell shorter and strongly tinged with red along their edges, while the dark red is more extended, especially in the tornal area where it covers the terminal three-fourths of interspaces 1 and 2, interrupted in 1 by a comparatively round oval black spot and in 2 by a broad elongate black patch; apical half of tail vermilion-red, whitish at apex.

Exp. ♂ ♀ 132–152 mm. (5·22–6·3″).

Hab. The Andamans.

513. **Papilio polymnestor** (Pl. XII, fig. 85), *Cramer, Pap. Exot.* i, 1775, p. 83, pl. 53, figs. A, B; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 101, pl. 3, figs. 1, 1 *a*, larva & pupa; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 366; *Rothsch. Nov. Zool.* ii, 1895, p. 329; *Moore* (Iliades), *Lep. Ind.* v, 1901–1903, p. 203, pl. 452, figs. 1, 1 *a*, 1 *b*, larva & pupa, ♂ ♀.

Race parinda.

Papilio parinda, *Moore* (Iliades), *Lep. Ceyl.* i, 1857, p. 148, pl. 60, figs. 1, 1 *a*–1 *b*, ♂ ♀, larva & pupa.
Papilio polymnestor parinda, *Rothsch. Nov. Zool.* ii, 1895, p. 330.

♂. *Upperside* rich velvety black. Fore wing with a postdiscal band composed of internervular broad blue streaks gradually shortened and obsolescent anteriorly, not extended beyond interspace 6. Hind wing: the terminal three-fourths beyond a line crossing the apical third of the cell pale blue, or greyish blue, with superposed postdiscal, subterminal and terminal series of black spots—the postdiscal spots elongate, inwardly conical; the subterminal oval, placed in the interspaces, the terminal irregular, placed along the apices of the veins and anteriorly coalescing more or less with the subterminal spots. *Underside* opaque black. Fore wing with an elongate spot of dark red at base of cell; the postdiscal transverse series of streaks as on the upperside but grey tinged with ochraceous and extended right up to the costa; in some specimens similar but narrow streaks also in the cell. Hind wing with five irregular small patches of red at base, the outer three-fourths of the wing grey touched with ochraceous, but generally narrower than the blue on the upperside; the inner margin of the grey area crosses the wing beyond the cell; the postdiscal and subterminal black spots as on the upperside. In some specimens this grey area is greatly restricted, its inner margin crossing the wing well beyond the apex of the cell; the subterminal spots merged completely with the terminal spots and form a comparatively broad terminal black band. Antennæ, head, thorax and abdomen blackish brown.—♀ very similar but the internervular streaks on the fore wing paler, extended into the cell both on the upper and undersides. Hind wing: the pale blue area on the upperside and the corresponding grey area on the underside paler. In some specimens there is a diffuse short crimson streak at the base of the cell of the fore wing on the upperside.

Exp. ♂ ♀ 131–156 mm. (5·48-6·14″).

Hab. Sikhim; Lower Bengal; Central and Southern India.

Larva and pupa. "We noticed this butterfly at Matheran in the month of March laying its eggs on a lime tree in the garden. In Karwar we reared a great many in September and October on a common wild orange (*Atalantia*, sp.?). Another favourite food appears to be *Garcinia xanthochymus*. In form, colour and markings the larva is very similar to that of the last two (*P. demoleus* and *P. polytes*), but the enlargement of the 4th and 5th segments is much exaggerated, especially after the last moult. In the pupa the head-case and its two projecting points are more elongated." (*Davidson & Aitken.*)

Race **parinda**, Moore.—I have, following Rothschild, regarded this form as a distinguishable race, but the males are very similar to the typical form, though the females can always be descriminated. It might well stand as *polymnestor* with a dimorphic ♀ in Ceylon.

♂. Differs in the broader postdiscal blue band on the upperside of the fore wing and the greater extent of the blue area on the hind wing.—♀ has the same band on the fore wing and the blue area on the hind wing much paler and invariably tinged (sometimes very strongly so) with yellow. On the underside both the band on the fore wing and the outer area on the hind wing are generally ochraceous-yellow without a touch of blue; the former much broader than in the typical form.

Exp. ♂ ♀ 130–156 mm. (5·16–6·14″).

Hab. Confined so far as is known to Ceylon.

Larva. "Smooth, glossy green; with a whitish lower lateral band from 6th to anal segment, a broad similar coloured band obliquely ascending the 8th and 9th and a similar band on the 10th segment; anterior shield edged with white, its posterior dorsal end bordered by a transverse blackish-marked crest, a similar crest also across the 4th segment ending on each side in a large ocellated spot. Feeds on *Citrus decumana*." (*Moore.*)

Pupa. "Green or olive-brown." (*Moore.*)

514. **Papilio polymnestoroides,** *Moore* (Iliades), *Lep. Ind.* v, 1901–1903, p. 202, pl. 451, figs. 1, 2, ♂ ♀.

♂ ♀. Differs from *P. polymnestor*, Cramer, as follows:—♂. *Upperside*, fore wing: the adnervular streaks on outer portion of wing not so broad. Hind wing: basal portion to apex of cell black, beyond this a series of adnervular blue streaks that do not reach the outer margin, each pair coming to a point outwardly on the veins; these are followed by a series of very obscure large subterminal spots of a shade darker than the ground-colour in interspaces 1 to 4. Cilia black, touched with white in the interspaces. *Underside* opaque black, a patch of dark red at base of wings. Fore wing as on the upperside but with the greyish-blue streaks broader. Hind wing with a discal and a subterminal series of large oval black spots, the former surrounded by a broad grey margin; tornus narrowly red. Antennæ, head, thorax and abdomen as in *polymnestor*.—♀. *Upperside*: fore wing with pale greyish adnervular streaks on outer half narrower than in *polymnestor*; base of cell entirely filled with a broad red streak; a very short streak above base of vein 1. Hind wing: ground-colour dull velvety brown, with discal, subterminal and terminal rows of black spots as in *polymnestor*, only more obscure; the medial area with a series of broad blue outwardly pointed adnervular streaks as in the ♂; the black spot at tornus bordered with grey. *Underside*: differs chiefly from the underside of *polymnestor* in the grey internervular streaks on the outer portions of the fore wing that are longer and produced to the bases of the anterior interspaces inwardly and outwardly almost to the terminal margin; on the hind wing the discal series of spots are closer to the subterminal series.

Exp. ♂ ♀ 127–148 mm. (5–5·86″).

Hab. Recorded only from Eastern Bengal and Assam.

I have provisionally followed Moore in keeping this form distinct from *P. polymnestor*, but it is probably only a rare aberration of that insect.

Protenor Group.

♂ ♀ alike. Fore wing somewhat elongate; costa arched, apex produced but rounded; termen oblique, slightly concave; tornus rounded; dorsum straight, about half length of costa; cell broad and long, more than half length of wing. Hind wing: costa and termen to apex of vein 2 form one long continuous curve, the termen broadly scalloped; dorsum to tornal angle straight, below the latter the termen emarginate; cell narrow, comparatively short; subcostal vein and upper discocellular subequal. ♂ with a white costal streak on the upperside of the hind wing. Antennæ not half length of fore wing, slender; club elongate, gradual, slight.

Represented within our limits by the typical form only: two others, *P. demetrius*, Cramer, and *P. macilentus*, Janson, are recorded from Japan and China.

515. **Papilio protenor**, *Cramer, Pap. Exot.* i, 1775, p. 77, pl. 49, figs. A, B; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 98; *Rothsch. Nov. Zool.* ii, 1895, p. 331; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 592, pl. w, fig. 23; *Moore* (Sainia), *Lep. Ind.* v, 1901–1903, p. 188, pl. 444, figs. 1, 1 *a*–1 *d*, larva, ♂ ♀.

♂. *Upperside* velvety indigo-blue black, duller on the fore wing than on the hind wing. Fore wing with pale adnervular streaks broadened along the terminal margin and extended well into the cell. Hind wing: a broad pale yellowish-white subcostal streak; interspaces 4 to 6 irrorated with bluish scales; tornal angle marked with red. *Underside*: fore wing dull black; adnervular streaks distinctly grey and much broader than on the upperside. Hind wing: ground-colour as on the upperside, a large irregularly-shaped patch at the tornal angle that extends into interspace 2, and subterminal lunules in interspaces, 2, 6, and 7 dull pinkish-red, cell irrorated more or less with a sprinkling of blue scales; the tornal patch with a black, outwardly blue-edged, round medial spot, and interspaces 4 and 5 with subterminal irrorations of blue scales. Antennæ black; head, thorax and abdomen dark brownish black.—♀ similar. *Upperside*: ground-colour deep brownish black; adnervular streaks on fore wing yellowish; irroration of blue scales on outer portions of hind wing more dense; no white subcostal streak; red patch at tornal angle large with an oval medial black spot; another similar black spot subterminally in interspace 2 posteriorly bordered by a crescent-shaped red mark. *Underside* similar to that in the male, differs in the adnervular streaks on the fore wing that are broader and paler; on the hind wing the tornal red patch is paler and larger, and is extended broadly anteriorly and outwards towards the termen into interspace 2; in the latter it coalesces with a broad subterminal black-centred red ocellus; the irroration of blue scales in interspace 5 with a small subterminal red lunule below it. Antennæ, head, thorax and abdomen as in the ♂.

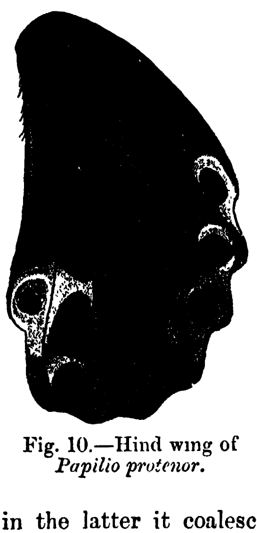

Fig. 10.—Hind wing of *Papilio protenor*.

Exp. ♂ ♀ 100–133 mm. (3·95–5·35").

Hab. The Himalayas, from Mussoorie to Sikhim in the low hot valleys, but ascending up to 5000 ft.; the hills of Assam, Burma and Tenasserim, extending to W. China and Siam.

Larva. "Green, with a yellow collar and brown lichen-like markings. Feeds on *Zanthoxylum alatum.*" (*Mackinnon.*)

Pupa. "Some pupæ are coloured like rough bark, others are uniformly green." (*Mackinnon.*)

Rhetenor Group.

♂. Fore wing elongate, costa widely arched; apex produced and somewhat pointed; termen very oblique; tornus broadly rounded; dorsum straight, very short, not nearly half length of costa; cell elongate, more than half length of wing. Hind wing elongate, costa and termen form a continuous curve, the latter broadly scalloped, abruptly curved upwards from apex of vein 3 to tornal angle; dorsum straight; cell comparatively short; upper discocellular much longer than middle. ♀. Similar, but the posterior portion of the hind wing below vein 4 broadly produced so as to give the appearance of a short broad spatulate tail at apex of vein 4. Antennæ slender, not half length of fore wing; club gradual, elongate, but well-marked; abdomen comparatively short and not massive.

A single form known.

516. **Papilio rhetenor** (Pl. XII, fig. 86 ♀), *Westwood, Arcana Ent.* i, 1842, p. 59, pl. 16, figs. 1, 1 *a*, ♂; *Moore, Cat. Lep. Mus. E.I.C.* i, 1857, p. 98; *Rothsch. Nov. Zool.* ii, 1895, p. 333: *Swinh.* (Sania) *Trans. Ent. Soc.* 1893, p. 312; *Moore* (Panosmiopsis), *Lep. Ind.* v, 1901-1903, p. 191, pl. 445, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂. *Upperside* black with, in some lights, an obscure dark indigo-blue tint. Fore wing: a series of pale adnervular streaks not extended to the base or quite to the termen but that reach well into the apical half of the cell, and a short slender streak of red rarely absent at the extreme base of the subcostal nervure. In certain specimens also the apical half of interspace 1 *a* and of the posterior portion of interspace 1 are diffusely white. Hind wing uniform, towards the terminal or outer half sprinkled with bluish scales; an irregular incomplete white ring at the tornal angle that encloses a black spot bordered above by red. *Underside*: fore wing similar, but with the pale adnervular streaks broader and much more prominent so that the wing has a general grey appearance; a patch of dark red at base traversed by the black veins. Hind wing deep indigo-blue black; a dark red patch at base as in the fore wing, but continued along the dorsum, nearly filling interspaces 1 and 2; superposed on the red in the former are two

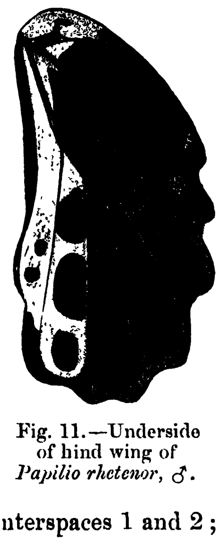

Fig. 11.—Underside of hind wing of *Papilio rhetenor*, ♂.

black spots and some irregular white scaling, and in the latter three large black spots in succession from the base: in some specimens the apical two spots coalesce anteriorly, in others there is also a red lunule near the apex of interspace 3; lastly, a diffuse spot of blue scaling near apices of interspaces 6 and 7. Antennæ, head, thorax and abdomen black, paler beneath.—♀. *Upperside*: ground-colour duller black. Fore wing: the adnervular streaks broader, paler, more prominent than in the ♂; the short red streak at base of subcostal vein broader. Hind wing: a medial patch of white that consists of an elongate spot at base of interspace 4, and a short streak that fills the basal half of interspace 5, extended diffusely into the apex of the cell and above into interspace 6; beyond this white patch is a discal series of three small red crescentic marks in interspaces 2, 4, and 5, or 2 and 4 only, followed by larger red lunules in interspaces 2 to 5, a lmarginal large red spots in 2 and 3, and a more or less large rectangular red spot centred with black at the tornal angle; cilia touched with white in the middle of the interspaces. The lunular red markings are very variable in number and are admarginal in interspaces 4 to 6. *Underside*, fore wing: ground-colour dull olivaceous black with the veins and internervular streaks velvety black, a red patch at base of cell. Hind wing: ground-colour black; markings more or less similar to those on the upperside, but both the white and the red more extensive, the latter so disposed as to form a patch at base of wing and a broad dorsal border below the median vein and vein 3; in interspaces 1, 2, and 3 it is interrupted by large black spots. Antennæ black; head, thorax and abdomen dull dark ochraceous brown.

Exp. ♂ ♀ 127–141 mm. (5·1–5·52″).

Hab. Sikhim; Nepal; Bhutan; the hills of Assam; Upper and Lower Burma; Tenasserim.

In the Himalayas this insect is recorded from the level of the Terai to 6000 ft. In Burma I took it on Mooleyit at 4000 to 5000 ft., and Col. Adamson on the Taoo plateau at about 4000 ft.

Bootes Group.

♂ ♀. Fore wing elongate; costa straight for basal two-thirds, then widely arched to apex; apex well-marked; termen very oblique; tornus broadly obtuse; dorsum short, not half the length of the costa; cell elongate, more than half the length of the wing; vein 8 from basal third of 7, 9 from upper apex of cell, 10 and 11 from apical half of subcostal vein. Hind wing very long and narrow; costa short, arched; termen very deeply scalloped, produced at apex of vein 4 into a broad spatulate tail, curved upwards from apex of vein 2; tornus well-marked; dorsum straight; abdominal fold in ♂ slight; cell comparatively short; upper discocellular much longer than middle.

Key to the forms of the Bootes *Group.*

a. Hind wing underside: red patch at base not produced along dorsum .... *P. bootes*, p. 56.
b. Hind wing underside: red patch at base produced along dorsum .... *P. janaka*, p. 57.

517. **Papilio bootes,** *Westwood, A. M. N. H.* ix, 1842, p. 36; *Rothsch. Nov. Zool.* ii, 1895, p. 335; *Moore* (Byasa), *Lep. Ind.* v, 1901-1903, p. 168, pl. 432, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂. *Upperside* velvety black. Fore wing with pale internervular streaks that do not reach the terminal margin and only obscurely extend into the cell. Hind wing with similar streaks in interspaces 5 and 6, but the ground-colour of the cell and of the lower and posterior portions of the wing uniform; interspaces 3 and 4 with elongate somewhat oval white spots at base, an admarginal red spot at tornus and at apex of interspace 2, and similar white spots intermixed with a few reddish scales as follows:—one at apex of interspace 3, two near apex of tail, one on each side of vein 4, and a fourth at apex of interspace 4; the cilia black, touched with white in the middle of the interspaces; over the red tornal spot is a minute crescentic mark of the same colour. *Underside* similar; the pale adnervular streaks on the fore wing are more prominent and extend well into the cell; two or three red spots at extreme base of costa. Hind wing: ground-colour as on the upperside, but in interspaces 6 and 7 silky black with a slight greenish lustre: markings as on the upperside, but the base of the wing dark red crossed by the black veins, the tornal red spot with a much broader lunular mark above it, and similar lunules above the admarginal spots in interspaces 2 and 3, that in 3 sometimes confluent with the admarginal spot. Antennæ,

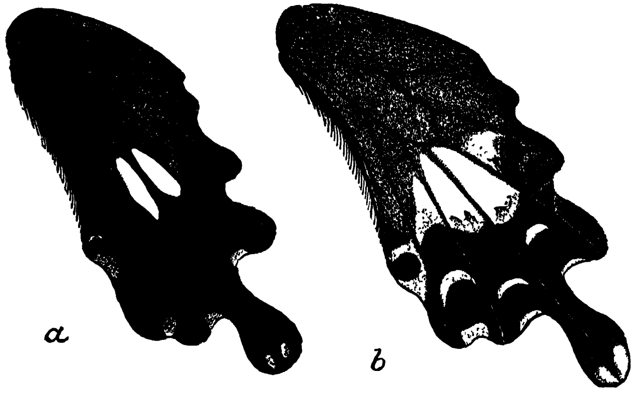

Fig. 12.—*a.* Hind wing: *P. bootes*, ♂.
b. Hind wing: *P. janaka*, ♂.

thorax posteriorly and abdomen black; head and thorax in front red: beneath: the palpi, thorax and abdomen red, the latter two with black markings.—♀. Similar. *Upperside*: ground-colour brownish black; fore wing with the internervular pale streaks broader and more prominent, a small spot of red at base of wing; hind wing with an additional oval white spot in the interspace below the white spots in interspaces 3 and 4, and postdiscal lunular markings in interspaces 1 to 4. Of these the lunules in 1 and 2 are red, in 3 white irrorated with a few red scales, and in 4 pure white. *Underside* similar to that in the ♂, the red at base of wings more extended, the white discal spot in interspace 2 very small, irrorated with red scales; the postdiscal, lunular and admarginal spots larger, with a white postdiscal lunule in interspace 4. Antennæ, head, thorax and abdomen similar to those of the ♂, but the red of a paler tint.

Exp. ♂ ♀ 118–133 mm. (4·28–5·25").

Hab. Recorded only from Assam.

A race, *P. bootes nigricans*, Rothschild, is recorded from Western China. It is easily recognized, as the white spots on the tail are always absent.

518. **Papilio janaka**, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 97: *Elwes, Trans. Ent. Soc.* 1888, p. 426; *Rothsch. Nov. Zool.* ii, 1895, p. 336; *Moore* (Byasa), *Lep. Ind.* v, 1901–1903, p. 169, pl. 433, figs. 1, 1 *a*, 1 *b*, ♂ ♀.
Papilio sikkimensis, *Wood-Mason, A. M. N. H.* (5) ix, 1882. p. 103, ♂.

♂ ♀. Closely resembles *P. bootes*, differs as follows:—♂. *Upperside*: ground-colour a duller more greyish-black, the outer half of the hind wing darker; the elongate discal white series of spots extended into interspace 2, sometimes also into interspace 5; beyond these the dark red markings are as in *P. bootes*, but there is in addition a postdiscal series of red lunules, that at the tornal angle coalesces with the admarginal spot. *Underside*: similar to that of *P. bootes*, but with the additional white spots as on the upperside, these however in many specimens are much irrorated with red scales; the red at the base of the wings more extended than in *P. bootes* and continued along the dorsal margin of the hind wing in a long streak.—♀. Similar to the ♂, but the ground-colour on the upperside paler, a spot of red at the base of the fore wing; the postdiscal markings on the hind wing white, only tinged with red. *Underside* similar to the upperside; the red at the base of the wings continued along the dorsal margin as in the ♂.

Exp. ♂ ♀ 116–125 mm. (4·6–4·93").

Hab. The Himalayas from Mussoorie to Sikhim.

"A rather rare species in Sikhim, where it is found from 3000 to 5000 ft. elevation in May and June." (*Elwes.*)

I saw it frequently at Rungarun near Darjeeling, 5000–6000 ft., in April 1900, but only managed to secure one on two specimens in bad condition.

Nephelus-Polytes Group.

Some of the members of this group, *chaon*, *prexaspes*, and *noblei*, bear a superficial resemblance to some of the *helenus* group, but they are all structurally different, as they lack the clothing of hair-like scales on the upperside of the fore wing so conspicuous in *helenus*, *daksha*, &c. Two rare forms, *P. sakontala*, Hewitson, and the still rarer *P. walkeri*, Janson, I have placed in this group with some doubt: the fore wing in both is more produced at apex than in *P. polytes* &c., and the shape of the club of the antennæ is also different.

♂ ♀. Fore wing broadly triangular, dorsum at least two-thirds length of costa. Hind wing elongate; costa slightly arched; termen scalloped, produced at apex of vein 4 into a broad spatulate tail. Venation of both wings much as in the *Helenus* group. In the two aberrant forms mentioned above, the tail at apex of vein 4 of hind wing is shorter and less spatulate.

Key to the forms of the Nephelus-Polytes *Group.*

♂ ♂.

A. Hind wing upperside: discal markings white.
  a. Hind wing upperside: discal markings confined to anterior portion of wing.
    a'. Hind wing upperside: discal markings extended from interspaces 3 or 4 to 7.
      a^2. Hind wing underside: no postdiscal markings placed between discal and subterminal markings .... *P. chaon*, p. 59.
      b^2. Hind wing underside: a more or less incomplete series of postdiscal diffuse blue lunules between discal and subterminal markings .... *P. fuscus*, race *prexaspes*, p. 59.
    b'. Hind wing upperside: discal markings extended from interspaces 5 to 7 only .... *P. noblei*, p. 60.
  b. Hind wing upperside: discal markings not confined to anterior portion of wing, but extended right across wing.
    a'. Hind wing upperside: discal band of nearly even width; medial spots that compose it not conspicuously longer than the others .... *P. polytes*, p. 61.
    b'. Hind wing upperside: discal band conspicuously broadened in the middle ...... *P. pitmani*, p. 63.
B. Hind wing upperside: discal markings bluish.
  a. Hind wing upperside: no postdiscal markings beyond some diffuse scattered bluish scales. *P. sakontala*, p. 64.
  b. Hind wing upperside: a conspicuous postdiscal transverse series of ochraceous-white subquadrate spots .... *P. walkeri*, p. 64.

519. **Papilio chaon,** *Westwood, Arcana Ent.* ii, 1845, p. 97, pl. 72, figs. 1, 1 *a*, ♂; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 102; *Rothsch. Nov. Zool.* ii, 1895, p. 291; *Moore* (Sadengia), *Lep. Ind.* v, 1901 1903, p. 213, pl. 457, figs. 1, 1 *a*–1 *d*, ♂ ♀.

♂ ♀. Superficially closely resembles *P. helenus*. The differences are, however, both of structure and of colour. ♂. Fore wing upperside: entirely without the thick coating of short hairs on the outer half. *Upperside*: black with a sprinkling of yellowish-brown scales on the fore wing, that form four longitudinal streaks on the cell and internervular streaks on the outer half. Hind wing: the upper discal white patch larger, formed of elongate broad streaks in interspaces 4 to 7 (not 5 to 7): no tornal nor subterminal markings. *Underside*: ground-colour duller brownish black; fore wing with the diffuse scaling so disposed as to form grey cellular and internervular streaks, the streaks in interspaces 1 *a* and 1 generally white, not diffuse. Hind wing: basal area sprinkled with yellow scales that form three longitudinal slender lines in the cell: the upper white discal patch as on the upperside, but the elongate white markings that compose it well divided by the black veins; below the discal white patch there is a small series of white spots in interspaces 1 to 3, the spot in 1 generally, in 2 very often, tinged with ochraceous yellow; a subterminal complete series of ochraceous-yellow lunules followed by admarginal narrow white spots. Antennæ, head, thorax and abdomen black; beneath: a line of white on the palpi, the thorax with some linear white markings. —♀. Similar. *Upperside*: ground-colour browner; fore wing: cellular and internervular streaks more prominent; in many specimens an obscure diffuse whitish subcostal shading just beyond apex of cell. *Underside* paler. Fore wing with the cellular and internervular streaks and subcostal postcellular whitish patch more prominent; the posterior three internervular short streaks on the outer half of the wing white, not diffuse; in a few specimens there is a series of more or less conspicuous admarginal white spots, one in the middle of each interspace. Hind wing markings similar to those in the ♂, but larger and more prominent. Antennæ, head, thorax and abdomen as in the ♂, but the abdomen beneath with lateral white markings.

Exp. ♂ ♀ 124–134 mm. (4·80–5·30″).

Hab. Nepal; Sikhim; Assam; Burma; Tenasserim; extending to Siam and China.

520. **Papilio fuscus,** *Goeze, Ent. Beytr.* iii, 1, 1779, p. 87.

Race prexaspes.

Papilio prexaspes, *Felder, Verh. z.-b. Ges. Wien*, 1864, p. 320; *id. Reise Novara, Lep.* i, 1865, p. 107, pl. 15, fig. *d*; *Wood-Mason & de Nicéville, J. A. S. B.* 1881, p. 254: *Moore* (Sadengia), *Lep. Ind.* v, 1901-1903, p. 215, pl. 458, figs. 1, 1 *a*–1 *c*, ♂ ♀.
Papilio fuscus prexaspes, *Rothsch. Nov. Zool.* ii, 1895, p. 297.

Race **prexaspes**, Felder.—Closely resembles *P. chaon*, from which it differs as follows:—♂ ♀. Smaller; fore wing more produced, its termen concave. ♂. *Upperside*: ground-colour a more brownish sooty-black. Hind wing with the upper discal white patch extended into interspace 4, most usually very slightly so, often represented only by a very small spot of white scaling, a white spot also above the tornal angle. *Underside*, fore wing: the internervular brownish-yellow streaks limited to the apical area of the wing. Hind wing: the upper discal patch extended to the dorsum in a series of three pure white not ochraceous-tinted spots, a more or less incomplete postdiscal series of lunules formed of diffuse blue scales, and the subterminal series of ochraceous lunules of a darker colour and smaller than in *chaon*; the rest as in *chaon*.—♀. *Upperside*: ground-colour paler than in *chaon*. Fore wing with an ill-defined broad pale discal band perceptibly widened and becoming whitish opposite apex of cell. Hind wing: the extension into interspace 4 of the upper discal white patch more pronounced than in the ♂, the small white spot above the tornal angle followed in some specimens by a blue ill-defined lunule and an ochraceous spot. *Underside*, fore wing: the transverse discal band white and much more prominent than on the upperside. Hind wing: the postdiscal series of blue lunules generally complete and well-marked; the rest as in the ♂.

Exp. ♂ ♀ 108–112 mm. (4·26–4·44″).

Hab. Within our limits found in the Andamans. Occurs in the Malay Peninsula and Borneo.

521. **Papilio noblei**, *de Nicéville, J. A. S. B.* 1888, p. 287, pl. 13, fig. 2: *Rothsch. Nov. Zool.* ii, 1895, p. 284; *Moore* (Sadengia), *Lep. Ind.* v, 1901-1903. p. 217, pl. 459, figs. 2, 2 *a*, ♂; *Fruhstorfer, Iris*, 1901, p. 268, ♀.

♂. *Upperside* black. Fore wing with or without a quadrate white spot in the middle of interspaces 1 *a* and 1; when present the portion of vein 1 that divides the interspaces also white; four slender lines in the cell and the veins paler than the ground-colour. Hind wing: a dark ochraceous incomplete ring at the tornal angle, with an enclosed deep black oval spot; above this an upper discal cream-white patch that consists of a quadrate spot in interspace 7, an elongate rectangular spot in interspace 6, and a trapezoidal spot in interspace 5. In one specimen that I have examined the spot in interspace 6 extends slightly into the cell. *Underside*: fore wing similar to the upperside, ground-colour duller brownish black; cellular lines greyish white and very prominent; a small white discal spot in interspace 2 followed by a terminal series of short white lines in the interspaces. Hind wing: basal third dull brownish black irrorated with greyish scales, the upper discal white patch as on the upperside but slightly larger, below it is a white elongate mark in interspace 1 and a subterminal complete series of broad ochraceous-orange lunules; the lower discal area, the tail, and the ground-colour before and behind the upper subterminal lunules velvety black. Antennæ, head, thorax and abdomen black; beneath: the palpi, thorax and abdomen marked with greyish white.

Exp. 106 mm. (4·80″).

Hab. Burma; Tonkin.

A rare insect; recorded from Taungoo and the Karen Hills in Lower Burma; from Katha and the Ruby Mines district in Upper Burma. Fruhstorfer took it in Middle Tonkin.

522. **Papilio polytes**, *Linn. Syst. Nat.* ed. x, 1758, p. 460, ♀; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 366, larva & pupa; *Rothsch. Nov. Zool.* ii. 1895, p. 343, ♂ ♀.

Papilio pammon, *Linn. Syst. Nat.* ed. x, 1758, p. 460, ♂; *Moore* (Laertias), *Lep. Ind.* v, 1901–1903, p. 223, pls. 462, 463, & 464.

Papilio romulus, *Cramer, Pap. Exot.* i, 1776, p. 67, pl. 43, fig. A, ♀; *Moore* (Laertias), *Lep. Ceyl.* i, 1857, p. 150, pl. 59, figs. 1, 1 *a*–1 *c*, ♂ ♀.

Papilio cyrus, *Fabr. Ent. Syst.* iii (1), 1793, p. 7.

A polymorphic form. The ♂ varies slightly, but is fairly constant throughout its range; the ♀ generally with two forms, in Southern India and Ceylon with three, strikingly different in appearance.

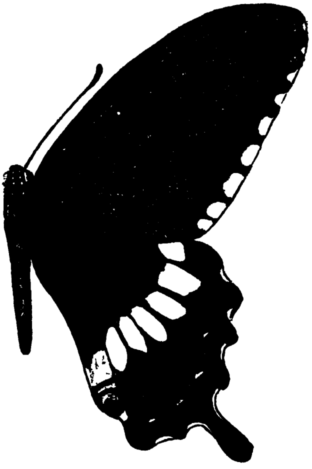

Fig. 13.—*Papilio polytes*, ♂.

♂ ♀. *Upperside* black. Fore wing: cell and apical area with not very prominent irrorated lines of pale yellowish scales, and admarginal white spots along the termen. Hind wing: a transverse discal series of elongate white spots in the interspaces from the dorsum to 7, these spots divided by the black veins and succeeded by diffuse ill-defined sparse blue scaling on the postdiscal area; an obscure spot of a deeper black than the ground-colour at the tornal angle surmounted by a lunule of blue scales. *Underside* similar; ground-colour of a duller more opaque black. Fore wing: the cellular and internervular irrorated streaks more prominent. Hind wing: the discal series of white spots and blue scaling succeeded by a subterminal more or less incomplete series of dingy white lunules, and a row of small admarginal spots in the interspaces along the termen; the tornal spot divided from the blue scaling by an ochraceous line. Antennæ, head, thorax and abdomen black; head and thorax anteriorly on the upperside and head, thorax and abdomen beneath spotted with white, the last with lateral white lines. The ♂ of the *cyrus* form differs as follows :—*Upperside*: the white markings larger, more neatly defined, the tornal spot with an ochraceous line above it. *Underside*: the subterminal series of lunules are complete, well defined, and vary from white to deep ochraceous-red. Certain specimens from the Nicobars have a subterminal band of white lunules on the upperside also.

♀. *Cyrus* form.—Similar to the ♂, the subterminal series of lunules on the underside ochraceous.

♀. *Polytes* form.—*Upperside* fuliginous-black on fore, somewhat darker and velvety on the hind wing. Fore wing with the base, the internervular streaks that extend into the cell, and terminal margin darker. Hind wing: apex of cell and elongate marks from base of interspaces 2, 3, 4, and 5 white: lower half of interspace 1 dark red irrorated with blue scales and with a superposed black tornal spot; the red extends into interspace 2, below the elongate white mark; finally, a complete subterminal transverse curved series of red lunules, and admarginal paler red spots in the posterior interspaces. *Underside* similar; a complete series of admarginal spots along the termen of the hind wing, the anterior spots white. Antennæ, head, thorax and abdomen black; beneath, the abdomen with lateral rows of white specks. The specimen described above is typical, and agrees with Linnæus' diagnosis, and also with the figures in Cramer's Pap. Exot. iii, pl. 265, figs. A, B, but this insect varies a good deal. Ordinarily the cell of the hind wing is uniform black to the apex, and the number of elongate white markings in the interspaces beyond vary from 2 to 6.

♀. *Romulus* form.—Resembles the ordinary *polytes* ♀ form, but differs as follows :—Fore wing crossed from the middle of the cell obliquely to the tornal angle by a broad white band somewhat as in *P. hector*, the margins of the band ill-defined; this is followed by an ill-defined white patch beyond the apex of the cell. Hind wing with all the discal as well as the subterminal and terminal markings red, including a round red spot at apex of cell.

Exp. ♂ ♀ 92–114 mm. (3·64–4·12″).

Hab. Almost throughout our limits, including the Andamans and Nicobars; extending to Siam and the Malayan subregion to Sumatra.

Larva and pupa. "The larva of this is not easy to distinguish from that of the last (*P. demoleus*), though of course it grows to a larger size. The pupa also is similar, but can be recognized at once, being proportionally much broader. This species also feeds on various species of orange and lime. We have never got it on rue." (*Davidson & Aitken.*)

I have seen two remarkable aberrations of the ♂ of this form. One (Pl. XVI, fig. 105), now in the Zoological Museum, Tring, differs from typical specimens as follows :—*Upperside*, fore wing: the admarginal white spots along the termen much larger and extended into interspace 8. Hind wing: the transverse discal series of elongate white spots replaced by a series of velvety-black spots darker than the ground-colour of the wing, bordered on the inner side narrowly, on the outer side much more broadly, by ill-defined diffuse blue scaling; the black spot at the tornal angle in interspace 1 centred by an irregular deep ochraceous-red spot, above this is a quadrate white spot and in line with it in interspace 2 a similar but narrower white spot; there is a minute white discal spot also in interspace 5. *Underside* similar to the upperside, the ground-colour duller; the markings on the fore wing similar, but the terminal white spots still larger. Hind wing: a discal series of extremely elongate streaks in the interspaces beyond the cell; these streaks are rich ochraceous-red mixed with white, but turn to pure white without any red in the anterior interspaces; the streaks in interspaces 1 to 5 interrupted along their inner halves by a row of spots of a shade darker than the ground-colour of the wing, which spots are outwardly bordered by diffuse blue scaling.

Exp. ♂ 98 mm. (3·88").

Hab. Procured at Coimbatore, S. India.

The other aberrational specimen, also a ♂, from Southern India, closely resembles typical specimens but on the hind wing the white spots of the transverse discal series are wanting in interspaces 1, 2, 3 and 7. This gives the insect a superficial resemblance both to *P. chaon* and *P. castor*.

523, **Papilio pitmani**, *Elwes & de N.* (Papilio-Laertias), *J. A. S. B.* 1886, p. 434, pl. 20, fig. 1 ♂; *Rothsch. Nov. Zool.* i, 1894, p. 685; *id. Nov. Zool.* ii, 1895, p. 343; *Moore* (Sadengia), *Lep. Ind.* x, 1901-1903, p. 216, pl. 459, figs. 1, 1 *a*, ♂.

♂. Very closely resembles *P. polytes* ♂, from which it can, however, be distinguished as follows:—*Upperside* of a more brownish-black than in *polytes*. Fore wing more thickly irrorated with yellowish scales; an obscure yellowish-brown spot (not always present) in interspaces 1 *a* and 1 close to the tornal angle: the admarginal spots along the termen so conspicuous in *polytes* entirely absent; cilia black, with a few touches of white on posterior half of wing. Hind wing: the postdiscal band of elongate white markings as in *polytes*, but the posterior one or two brownish yellow; the tornal ocellus generally obscure and ill-defined. *Underside* similar; ground-colour a duller brownish black, the irroration of yellowish scales more prominent, formed into lines in the cell of the fore wing and internervular broad streaks on the anterior half of the same; a transverse subterminal series of diffuse white spots on the fore wing that vary from a single spot in interspace 1 *a* to double spots in interspaces 1 to 4. Hind wing: the postdiscal band of white spots as on the upperside, followed by a subterminal series of yellow lunules. Cilia black irregularly alternated with white. Antennæ, head, thorax and abdomen dull brownish black.—♀ unknown.

Exp. ♂ 90-94 mm. (3·58-3·69").

Hab. Recorded only from the hills of South Tenasserim below Tavoy and Siam.

524. **Papilio sakontala**, *Hewitson, Trans. Ent. Soc.* (2) ii. 1852, p. 24, pl. 5, fig. 1; *Doherty, P. Z. S.* 1891, p. 250; *Rothsch. Nov. Zool.* ii, 1895, p. 343; *Mackinnon & de Nicéville, Jour. Bomb. N. H. Soc.* xi, 1898, p. 593; *Moore* (Laertias), *Lep. Ind.* v, 1901-1903, p. 232, pl. 465, figs. 1, 1 *a*, ♂.

♂. *Upperside* dull, somewhat brownish black. Fore wing very sparingly irrorated with yellowish scales, that form ill-defined cellular and internervular streaks. Hind wing with a discal series of very diffuse greenish-white spots in interspaces 1 to 7 and an ill-defined tornal reddish lunule; the spots in interspaces 5 and 6 are the most diffuse, and beyond the whole series there is a postdiscal slight irroration of whitish scales. *Underside*: fore wing opaque dark brown, the internervular streaks broader, more prominent than on the upperside. Hind wing black; the discal series of elongate spots dingy white, larger and more clearly defined than on the upperside, followed by a large tornal more or less vermilion-red spot with a black centre and a subterminal series of similarly-coloured lunules; the discal spot in interspace 2 bordered outwardly by an outwardly-curved lunule. Cilia black alternated with white. Antennæ, head, thorax and abdomen black.—♀ unknown.

Exp. ♂ 107 mm. (4·23").

Hab. Mussoorie; Sikhim; Assam; Sylhet and the Naga Hills.

I have followed Rothschild in keeping this form distinct, but both ♂ and ♀ seem to me to be only occasional aberrations of *P. polytes*, or possibly, as suggested by de Nicéville, atavistic forms of that insect.

525. **Papilio walkeri** (Pl. XVI, fig. 105), *Janson, Cist. Ent.* ii, 1879, p. 433, pl. 8, fig. 2 ♂; *Rothsch. Nov. Zool.* ii, 1895, p. 338; *Moore* (Laertias), *Lep. Ind.* v, 1901-1903, p. 233, pl. 465, fig. 2 ♂.

♂. *Upperside* sooty-black. Fore wing: cell with four, interspace 1 with three and each of the interspaces 2 to 8 with two short longitudinal lines or narrow bands of ochraceous scales, those in the interspaces postdiscal; terminal margin with small white spots at the apices of the veins. Hind wing: a broad transverse discal band of blue scaling, somewhat diffuse at the edges, followed by a transverse postdiscal series of ochraceous-white quadrate spots, those in interspaces 5 and 6 more or less lunular, and a terminal series of similarly-coloured very slender lunules in the interspaces. *Underside*: ground-colour duller on the fore wing, more sooty-brown than black. Fore wing as on the upperside, but the lines or bands of the postdiscal series more elongate in the anterior interspaces. Hind wing: ground-colour slightly darker than in the fore wing, the blue transverse discal band replaced by short very broad streaks of inwardly ochraceous, outwardly blue scales in interspaces 1 to 4, and indications of similar streaks in the interspaces above, the ochraceous and blue scaling in the streaks separated by a black spot; the transverse postdiscal series of spots and the terminal series of narrow lunules as on the upperside but larger; finally, an intervening transverse series of velvety-black spots between the discal and postdiscal markings. Antennæ, head, thorax and abdomen sooty-black, a few white specks on the thorax below.

Exp. ♂ 113 mm. (4·06").

Hab. Southern India.

This extremely rare form is only known through the type which is contained in the Zoological Museum, Tring. Through the courtesy of the Honourable Walter Rothschild and Dr. Jordan I have been able to describe and figure this.

CASTOR GROUP.

♂ ♀. Fore wing: costa widely but distinctly arched, apex obtuse; termen straight, not concave or convex, slightly oblique; tornus rounded; dorsum straight, two-thirds or more the length of costa; cell elongate, longer than half the length of the wing; vein 8 from basal third of vein 7. Hind wing: costa slightly arched, apex obtusely rounded, or costa and termen form one continuous bold curve; termen scalloped; dorsum somewhat elongate, straight; abdominal fold in ♂ narrow; cell moderately long; subcostal vein and upper discocellular subequal. Antennæ not quite half the length of the fore wing; club slight, gradual, curved; head, thorax and abdomen moderately long, not massive.

Key to the forms of the Castor *Group.*

♂ ♂.

a. Fore wing upperside without subterminal white markings.
  a'. Hind wing upperside with discal white markings.
    a². Hind wing upperside: discal markings not complete, composed of broad white streaks in interspaces 4 to 7 .... *P. castor*, p. 66.
    b². Hind wing upperside: discal markings complete, composed of elongate broad white spots or streaks in interspaces 1 to 7......................... *P. castor*, race *mehala*, [p. 67.
  b'. Hind wing upperside without discal but with postdiscal white markings .... *P. mahadeva*, p. 67.
b. Fore wing upperside with a prominent subterminal series of white markings .... *P. dravidarum*, p. 68.

♀ ♀.

a. Hind wing upperside: apex of cell with an ill-defined patch or streaks of white scales .. *P. castor*, p. 66.
b. Hind wing upperside: cell uniform, without markings.
  a'. White spots of subterminal series on fore wing gradually larger towards costa .. *P. castor*, race *mehala*, [p. 67.

b′. White spots of subterminal series on fore wing not larger towards costa, all equal or subequal.
a^2. These spots minute .... *P. mahadeva*, p. 67.
b^2. These spots much larger .... *P. dravidarum*, p. 68.

526. **Papilio castor**,[*] *Westwood*, *A. M. N. H.* ix, 1842, p. 37, ♂; *Moore*, *Cat. Lep. Mus. E. I. C.* i, 1857, p. 93; *Rothsch. Nov. Zool.* ii, 1895, p. 357; *Moore* (Tamera), *Lep. Ind.* vi, 1903, p. 74, pl. 496, figs. 1, 1*a*-1*e*, & pl. 497, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Race mehala.

Papilio mehala, *Grose-Smith*, *A.M.N.H.* (5) xviii, 1886, p. 150, ♂ ♀; *id.* & *Kirby*, *Rhop.Exot.* i, 1888, Pap. pl. 2, figs. 1 & 2, ♂ ♀; *Moore* (Tamera), *Lep. Ind.* vi, 1903, p. 76, pl. 498, figs. 1, 1*a*-1*c*, ♂ ♀.
Papilio castor mehala, *Rothsch. Nov. Zool.* ii, 1895, p. 358, ♂ ♀.

♂. *Upperside* black, more or less irrorated with yellowish-brown scales that form on the fore wing somewhat indistinct longitudinal cell-lines and internervular streaks. Hind wing: an upper discal cream-coloured patch composed of an oval spot in interspace 4, a more elongate mark broadened outwardly in interspace 5, a similar elongate mark in interspace 6, and a much smaller broadly oval spot above it in 7; these markings not coalescent but distinctly divided by the black veins. Cilia of fore and hind wings black alternated with white. *Underside* duller, more opaque; brownish-black apical area of fore and base of hind wing thinly sprinkled

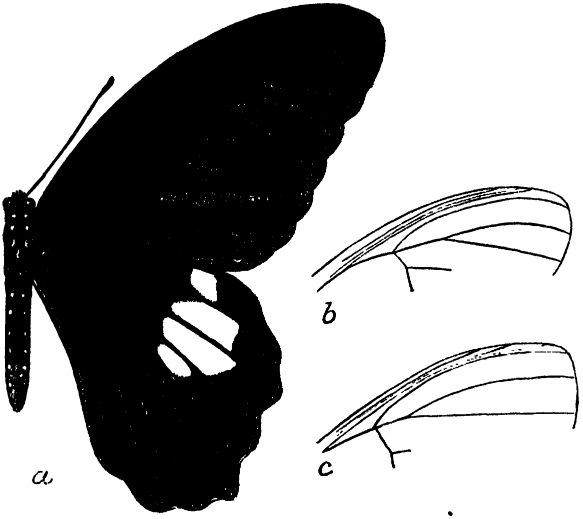

Fig. 14.—*a*. *Papilio castor*, ♂.
b. Venation of anterior portion of fore wing of *P. castor*.
c. ,, ,, ,, ,, *P. clytia*.

with yellowish-brown scales. Fore wing: a small white spot on middle discocellular and a subterminal and terminal row of small white specks that do not extend to the costa. Hind wing: markings similar to those on the upperside but smaller, more widely divided one from the other by the veins which are edged with black; a subterminal more or less well-defined series of small white lunules and a terminal series of white specks. Antennæ, head, thorax and abdomen black; beneath: a spot behind the eyes and spots and specks on the thorax and abdomen white.—♀. *Upperside* a duller more opaque black than in the ♂, but more densely irrorated with yellowish- or reddish-brown scales. Fore wing: markings as in the ♂, with in addition postdiscal and terminal series of small white spots that generally do not extend to the costal margin. Hind wing: a discal series of diffuse broad whitish streaks in the interspaces that extend into the apex of the cell, followed by a complete transverve curved subterminal series of white lunules; the ground-colour beyond each lunule devoid of the irroration of yellowish-brown scales; this gives the appearance of a row of terminal black spots impressed on the wing. Cilia black alternated with white. *Underside* similar, the white markings larger and more prominent. Fore wing: diffuse whitish streaks in interspaces 1*a*, 1 and 2, and the subterminal and terminal series of white spots complete. Hind wing with diffuse whitish streaks that extend up to the base of the wing. Antennæ black; head, thorax and abdomen dull brown spotted with white.

Exp. ♂ ♀ 88–126 mm. (3·50–5″).

Hab. Sikhim; Assam; Upper Burma, extending to Siam. Found at low elevations in Sikhim at from 1000 to 3000 feet.

Race **mehala**, Grose-Smith.—♂. *Upperside* velvety dark brown; a minute white spot on the middle discocellular and a series of terminal white specks in each interspace. Hind wing: a discal series of seven elongate, more or less inwardly conical, outwardly emarginate cream-coloured spots, followed by a subterminal series of lunular small white spots. Cilia black, alternated with white in the interspaces. *Underside* brownish-black, markings similar. Fore wing with the terminal series of white specks elongated inwards. Hind wing: the markings somewhat larger. Antennæ, head, thorax and abdomen brownish black; head, thorax and abdomen speckled with white.—♀. Similar to the ♂, but on the upperside a subterminal series of white spots on the fore wing, sometimes with the anterior ones enlarged, sometimes with the series incomplete. Hind wing as in the ♂.

Exp. ♂ ♀ 110–120 mm. (4·34–4·73″).

Hab. Lower Burma; Tenasserim.

527. **Papilio mahadeva**, *Moore, P. Z. S.* 1878, p. 840, pl. 51, fig. 1; *Rothsch. Nov. Zool.* ii, 1895, p. 359; *Moore* (Tamera), *Lep. Ind.* vi, 1903, p. 77, pl. 499, figs. 1, 1*a*–1*c*, ♂ ♀.

♂. *Upperside* black, sprinkled somewhat closely with reddish-brown scales that give the whole ground-colour a rich brown tint. Fore wing uniform; a line of ciliary white specks that do not reach the apex. Hind wing: a conspicuous postdiscal complete series of inwardly conical white spots, followed by a complete series of slender well-defined white lunules and a ciliary row of linear white specks; between the latter two the ground-colour is devoid of the irroration of brown scales, this gives an appearance as of a terminal row of more or less distinct black spots impressed on the wing. *Underside* duller black, much more densely irrorated with reddish-brown scales. Fore wing: a small quadrate white spot across the middle discocellular and transverse series of subterminal and terminal white specks, the former series anteriorly more or less obsolete. Hind wing with the white markings as on the upperside, but in some specimens the postdiscal series of conical white spots has some of the anterior spots ill-defined or absent.— ♀ similar to the ♂, but the ground-colour on both upper and undersides paler with the markings on the whole slightly larger. In some specimens the outer half of the fore wing on the upperside is conspicuously paler than in any specimen of the ♂.

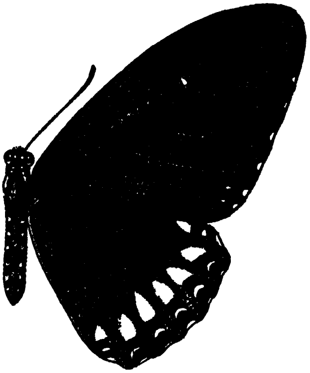

Fig. 15.—*Papilio mahadeva*, ♂.

Exp. ♂ ♀ 93–100 mm. (3·68–3·87").

Hab. Upper and Lower Burma; Tenasserim, extending to Siam.

528. **Papilio dravidarum**, *Wood-Mason, J. A. S. B.* 1880, p. 144, ♂ ♀, pl. 8, fig. 1 ♂ ; *Rothsch. Nov. Zool.* ii, 1895, p. 359 ; *Ferguson, Jour. Bomb. N. H. Soc.* vi, 1891, p. 446 ; *Moore* (Tamera), *Lep. Ind.* vi, 1903, p. 79, pl. 500, figs. 1, 1*a*–1*c*, ♂ ♀.
Papilio abrisa, *Kirby, Proc. Roy. Dub. Soc.* (2) xi, 1880, p. 338 ; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 583.

♂. *Upperside* velvety black. Fore wing: outer half and four somewhat indistinct longitudinal lines in the cell irrorated with yellowish-brown scales; a small white spot across the middle discocellular; a subterminal series of inwardly conical white spots and a terminal series of white spots that decrease in size towards the costa, most often the spots do not extend beyond interspace 6; following each subterminal spot are spots of the black ground-colour formed by the absence of the irroration of yellowish-brown scales. Hind wing: posterior three-fourths irrorated with yellowish-brown scales; a very prominent discal series of inwardly conical, outwardly emarginate, elongate white spots followed by a subterminal series of white lunules with spots of the black ground-colour that succeed them as on the fore wing. Cilia black, largely alternated with white in the interspaces. *Underside* similar with similar markings, but the ground-colour a rich hair-brown, the markings larger; the irroration of yellowish-brown scales confined to the apical area on the fore wing but spread all over the hind wing except on the white markings. Antennæ, head, thorax and abdomen dark brownish black, head and abdomen minutely speckled with white; beneath, the white specklings larger and more numerous.—♀ closely resembles the ♂ but the ground-colour is distinctly paler, the white markings larger, and the irroration of yellowish-brown scales more conspicuous.

Exp. ♂ ♀ 116–124 mm. (4·18–4·88").

Hab. Southern India: Kanara; Mysore; the Nilgiris and Travancore.

Larva & pupa. "A larva found feeding on *Glycosmis pentaphylla*, Correa, was taken for a dull specimen of *P. polytes*, Linn., and only when it became a chrysalis did we note that it was different. The chrysalis differs from that of *P. erithonius*, Cramer (= *P. demoleus*, Linn.) chiefly in that it is more bent back in the thorax, and that the apex of the thorax is produced into a short blunt parallel apipedal process; it is coloured like that of *P. polytes*, Linn." (*Davidson, Bell & Aitken.*)

AGESTOR GROUP.

♂ ♀. Fore wing elongate; costa straight for two-thirds of its length from base, then curved to apex; apex obtuse but well-marked; termen very oblique, from very slightly concave or sinuous to convex; tornus broadly rounded; dorsum straight, about two-thirds the length of the costa; cell long, well over half length of wing; vein 8 out of basal fourth of 7. Hind wing: costa long, equal in length to the dorsum, slightly arched; apex obtuse; termen slightly arched and sinuous; tornus rounded or angulate; cell more or less rounded at apex: upper discocellular comparatively short, about half the length of the subcostal vein. Antennæ very short, about one-third the length of the fore wing, club slight, gradual; head, thorax and abdomen comparatively long, not massive.

The forms in this and in the *Clytia* group are wonderfully like some of the protected *Danaine* forms. It is remarkable that the difference in the markings on the upperside of the hind wings in *Euplœa dione*, Westwood, and *Papilio slateri*, Hewitson, from Sikhim and Assam and their respective races, *E. limborgi*, Moore, and *P. tavoyanus*, Butler, should be identical; the subterminal series of elongate white spots on the upperside of the hind wing is barely indicated or wanting in the former two, but present and conspicuous in the latter two.

Key to the forms of the Agestor *Group.*

a. Fore wing upperside: ground-colour black with bluish-grey or white markings.	
a'. Hind wing: ground-colour chestnut-red, markings bluish-grey.	
*a*². Hind wing upperside: postdiscal series of bluish-grey spots not complete, not extended as a rule below interspace 5	*P. agestor*, p. 70.
*b*². Hind wing upperside: postdiscal series of bluish-grey spots complete, extended from interspaces 1 to 7	*P. agestor*, race *govindra*, p. 71.
b'. Hind wing: ground-colour black; markings white or greyish-white..................	*P. epycides*, p. 71.
b. Fore wing upperside: ground-colour black, markings brilliant blue with a violet tint.	
a'. Hind wing upperside: no subterminal series of short white streaks or such only faintly seen by transparency from underside......	*P. slateri*, p. 72.
b'. Hind wing upperside: a prominent subterminal series of short white streaks always present.	*P. slateri*, race *tavoyanus*, p. 73.

529. **Papilio agestor**, *Gray, Zool. Misc.* i, 1832, p. 32; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 91; *id.* (Cadugoides) *P. Z. S.* 1882, p. 260; *Rothsch. Nov. Zool.* ii, 1895, p. 360; *Moore* (Cadugoides), *Lep. Ind.* vi, 1903, p. 101, pl. 508, figs. 1, 1*a*–1*c*, ♂ ♀.

Race govindra.

Papilio govindra, *Moore, Ent. Month. Mag.* 1864 65, p. 101 (*footnote*), ♂; *id.* (Cadugoides) *P. Z. S.* 1882, p. 261; *id.* (Cadugoides), *Lep. Ind.* vi, 1903, p. 103, pl. 509, figs. 1, 1*a*–1*d*, larva & pupa, ♂ ♀.

Papilio agestor govindra, *Rothsch. Nov. Zool.* ii, 1895, p. 361; *Mackinnon & de Nicéville, Jour. Bomb. Nat. Hist. Soc.* xi, 1898, p. 594, pl. 5, fig. 22, *a–d*, larva & pupa.

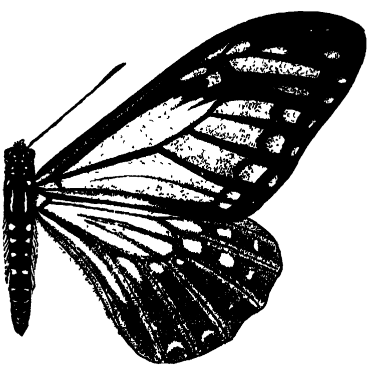

Fig. 16.
Papilio agestor, ♂.

♂ ♀. *Upperside*: fore wing black with the following bluish-grey markings:—a very slender line along costal margin, a broad streak from base in cell that does not reach the apex of the same, two spots on the black area at apex, a long streak in interspace 1*a*; two elongate broad streaks in interspace 1 divided by a slender black ill-defined line; broad rectangular streaks in interspaces 2, 3, 4 and 6; a narrower inwardly obsolescent streak in interspace 5, and elongate spots in interspaces 8, 9, and 10; the streaks in interspaces 1 to 4 crossed transversely near their apices by a line of the ground-colour; finally a complete subterminal series of small whitish spots. Hind wing rich chestnut-red; cell filled by a trifid bluish-grey streak, followed at the bases of interspaces 2 to 6 by elongate bluish-grey spots; a narrow streak of the same colour from base in interspace 1; a postdiscal series of spots in interspaces 5, 6 and 7 and a more or less obsolescent subterminal series of dots also bluish-grey; the veins on the wing conspicuously paler than the ground-colour. *Underside*: fore wing similar to the upperside except that the ground-colour on the apical area is dull brown not black. Hind wing also as on the upperside, but the ground-colour on the disc of the wing of a darker deeper shade of chestnut; the postdiscal series of spots more or less obscurely complete from interspace 1 to 7; and the subterminal series of spots of the upperside formed into lunules. Antennæ, head, thorax and abdomen black, the head and thorax variegated with bluish-grey spots, the abdomen with lateral transverse bars.

Exp. ♂ ♀ 94–102 mm. (3·7–4·04″).

Hab. Sikhim; Nepal; Assam; Burma; Tenasserim; extending to the Malay Peninsula.

Race **govindra**, Moore.—♂ ♀. Very closely resembles the typical form but can always be distinguished by the presence of a complete series of postdiscal bluish-grey spots on the upperside of the hind wing. It is generally also smaller in both sexes than typical *agestor*, and on the upperside of the hind wing the ground-colour in the anterior interspaces is broadly centred along the middle with very dark brown, almost black. The ♀ frequently has the ground-colour of the hind wing a much brighter chestnut (almost ochraceous) than in any specimen of ♀ of *agestor* that I have seen.

Exp. ♂ ♀ 93–102 mm. (3·65–4″).

Hab. The Himalayas from Kashmir to Kumaon.

"The ♀ lays her eggs on the young leaves of *Machilus odoratissimus* trees, Natural Order *Laurinæ*, about the end of April. The larva is at first of a reddish colour but very soon turns black and white, and lies on the upper surface of a leaf where it greatly and protectively resembles a bird's droppings." *Adult larva*: brown with two subdorsal and two lateral rows of fleshy-pointed tubercles, each with a spot of red at its base; anterior, middle and posterior lateral patches of dull ochraceous, the latter two meeting on the dorsum; the rest of the larva spotted with black and red. "*Pupa* dark brown with lines of dull ochraceous, roughened, with the anal end truncate." (Described from plate to Mackinnon & de Nicéville's paper.)

530. **Papilio epycides**, *Hewitson*, *Exot. Butt.* iii, 1864, pl. 6, fig. 16 ♂; *Elwes*, *Trans. Ent. Soc.* 1888, p. 432, ♂ ♀; *Rothsch. Nov. Zool.* ii, 1895, p. 361; *Moore* (Cadugoides), *Lep. Ind.* vi, 1903, p. 104, pl. 510, figs. 1, 1*a*–1*e*, ♂.

♂. *Upperside* dull black, with the following somewhat dingy white markings that resemble in their disposition the markings in *P. agestor*. Fore wing: cell with two streaks from base that diverge outwardly and reach the apex, three shorter streaks between and above them at apex; interspace 1*a* with an elongate streak that does not reach the termen; two streaks in interspace 1 divided by a black line as in *agestor*; a series of more or less rectangular broad streaks in interspaces 2 to 6 with elongate spots in 7 and 8; a very slender costal streak from base; finally a series of subterminal spots in interspaces 1 to 5 succeeded above in interspaces 6 and 7 by ill-defined subterminal streaks. Hind wing: cell white traversed longitudinally by two short black lines, the upper one forked near apex; a discal series of broad white streaks from the dorsal margin in the interspaces 1 to 7, the streaks in interspaces 2 to 6 short and more or less rectangular; transverse series of postdiscal and subterminal white spots beyond, the postdiscal spots in interspaces 6 and 7 coalescent with the discal streaks in those interspaces; finally, a tornal prominent ochraceous-yellow spot. *Underside* similar, the ground-colour outwardly on the fore wing and over the whole of the hind wing more or less of a chestnut tint; markings similar to those on the upperside but broader and on the fore wing diffuse towards the apex; on the hind wing the discal streak in interspace 7 is absent and there is an edging of white anteriorly in the yellow spot at the tornal angle. Antennæ, head, thorax and abdomen black; the head and thorax spotted with white; the abdomen with three rows of white spots along the sides.—♀ "has the markings larger than the ♂ and mostly of a much paler colour; the submarginal spots of the hind wing are specially enlarged. The fore wings have often some minute linear spots between the outer margin and the submarginal series of rounded markings in both sexes. The yellow anal spot is slightly variable in size." (*Rothschild.*)

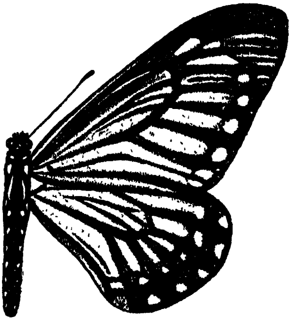

Fig. 17.
Papilio epycides, ♂.

Exp. ♂ ♀ 80–84 mm. (3·14–3·3″).
Hab. Sikhim; Nepal; Bhutan; Assam; Upper Burma.

531. **Papilio slateri,** *Hewitson, Exot. Butt.* ii, 1859, pl. 4; *Elwes, Trans. Ent. Soc.* 1888, p. 429, ♂ ♀; *Rothsch. Nov. Zool.* ii, 1895, p. 362; *Moore* (Menamopsis), *Lep. Ind.* vi, 1903, p. 106, pl. 513, figs. 1, 1*a*–1*d*, ♂ ♀.

Race tavoyanus.

Papilio tavoyanus, *Butler, A. M. N. H.* (5) x, Novr. 1882, p. 373; *Moore* (Menamopsis), *Lep. Ind.* vi, 1903, p. 107, pl. 514, figs. 1, 1*a*–1*d*, ♂.

Papilio claræ, *Marshall, J. A. S. B.* Decr. 1882, p. 42, pl. 4, fig. 5.
Papilio slateri tavoyanus, *Rothsch. Nov. Zool.* ii, 1895, p. 363.

♂. *Upperside*: fore wing rich velvety black, slightly paler towards apex and along the terminal margin; two or three somewhat obscure spots or short streaks in apex of cell followed by an internervular series of slightly clavate, outwardly truncate, blue streaks that in certain lights have a violet tint; outwardly the ends of these streaks form a curve at some distance from the terminal margin and inwardly they do not reach the bases of the interspaces. Hind wing: dark chocolate-brown, the subterminal series of short white streaks of the underside show though very faintly; a comparatively large ochraceous tornal spot inwardly margined with black. *Underside* dull chocolate-brown. Fore wing: the cellular and internervular blue streaks of the upperside faintly represented by diffuse white patches of scales. Hind wing: a small white spot at extreme base of wing; a subterminal series of inwardly diffuse white streaks in the interspaces and an ochraceous tornal spot as on the upperside. Antennæ, head, thorax and abdomen black; the thorax beneath sparsely speckled with white; the abdomen with two lateral rows of small spots.— ♀. Similar to the ♂; the blue intercellular and internervular streaks on the upperside of the fore wing slightly more prominent.

Exp. ♂ ♀ 96–114 mm. (3·80–4·5").

Hab. Sikhim; Assam: the Khasia and Naga Hills.

Race **tavoyanus**, Butler.— ♂. Very similar to the typical form but sufficiently different to be considered a well-marked geographical race. *Upperside*, fore wing: the ground-colour of the terminal margin broadly rich chocolate-brown, the internervular blue streaks more irregular, not clavate nor with their outer ends truncate. Hind wing: a very prominent subterminal series of short white streaks; the ochraceous tornal spot as in typical *slateri*. *Underside*: ground-colour paler than in the typical form, the fore wing uniform with no faint patches of whitish scales. Hind wing as in *slateri*, but the subterminal series of white streaks longer than in that form, also longer than on the upperside. Antennæ, head, thorax and abdomen as in typical *slateri*.— ♀. So far as I know not yet discovered.

Exp. ♂ 94–100 mm. (3·7–3·95")

Hab. Burma: the hills of both Upper and Lower Burma; Tenasserim, extending to Siam.

Clytia Group.

♂ ♀. Sexes alike. Hind wing not tailed. Fore wing broad, apex scarcely produced; costa slightly arched; termen straight, subequal with dorsum; tornus broadly rounded; cell longer than half the length of the wing; vein 8 from basal fourth of 7, vein 9 from upper apex of cell, 10 and 11 free, from apical half of subcostal vein. Hind wing comparatively short and broad, pear-shaped costa slightly arched; termen strongly arched, slightly scalloped; tornus well-marked; dorsum straight; abdominal fold in ♂ very slight; cell narrow, about half length of wing, upper discocellular obviously longer than middle and slightly longer than subcostal vein. Antennæ short, not half the length of the fore wing; club long, gradual; abdomen elongate, nearly extended up to the tornal angle of the hind wing.

The forms in this group have nearly all a wonderful resemblance to forms of *Euplœa* and *Danais*, and it requires a quick eye and some experience to discriminate between *Euplœa godarti* and *Papilio clytia* race *panope*, and between *Danais limniace* and the *dissimilis* form of *P. clytia*, especially when on the wing.

Key to the forms of the Clytia *Group.*

A. Fore wing upperside: not glossed with blue, or if blue-glossed, then wing uniform without other markings.
  a. Basal half or more of both fore and hind wing uniform without white markings.
    a'. Fore wing upperside: no blue gloss at base.
      a^2. Fore wing upperside with prominent subterminal and terminal, sometimes also a postdiscal, series of white spots.
        a^3. These spots not elongate, not coalescent towards apex and not formed into a prominent apical white patch. *P. clytia*, p. 75.
        b^3. These spots elongate and coalescent towards apex and there form a prominent white patch .... *P. clytia*, race *panope*, p. 78.
      b^2. Fore wing upperside without or with only more or less obsolescent series of subterminal and terminal white spots; such spots when present always very small .... *P. clytia*, race *lankeswara*, p. 77.
    b'. Fore wing upperside with a more or less obvious blue gloss at base .... *P. clytia*, var. *papone*, p. 77.
  b. Basal half of fore and hind wing not uniform, with a streak in cell and in posterior interspaces.
    a'. Hind wing upperside: discal series of white streaks broad and long; underside: terminal series of ochraceous-yellow spots not remarkably large .... *P. clytia*, dimorph *dissimilis*, p. 76.
    b'. Hind wing upperside: discal series of white streaks short and narrow; underside: terminal series of ochraceous-yellow spots remarkably large .... *P. clytia*, race *flavolimbatus*, p. 78.
B. Fore wing upperside: richly glossed with blue.
  a. Hind wing: ♂ without, ♀ with, whitish streaks in cell and interspaces that extend up to base of wing .... *P. paradoxus*, race *telearchus*, p. 78.
  b. Hind wing: ♂ ♀ with white discal markings, but none that extend up to base of wing .. .. *P. caunus*, race *danisepa*, p. 79.

532. **Papilio clytia,** *Linn. Syst. Nat.* ed. x, 1758, p. 479; *Auriv. Kongl. Sv. Vet.-Ak. Handl.* xix, 5, 1782, p. 96; *Rothsch. Nov. Zool.* ii, 1895, p. 364; *de Nicéville & Mackinnon, Jour. Bomb. N. H. Soc.* xi, 1898, p. 594; *Moore* (Chilasa), *Lep. Ind.* vi, 1903, p. 82, pl. 501, figs. 1, 1 *a* 1 *c*, ♂ ♀.

Papilio dissimilis, *Linn. Syst. Nat.* ed. x, 1758, p. 479; *Doubleday, in Dblday., Westw. & Hewits. Gen. Di. Lep.* i, 1846, p. 21; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 91; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 368; *Moore* (Chilasa), *Lep. Ind.* vi, 1903, [p. 89, pl. 506, figs. 1, 1 *a*-1 *d*, larva & pupa, ♂ ♀.

Papilio clytia, *ab.* dissimilis, *Rothsch. Nov. Zool.* ii, 1895, p. 365.

Papilio papone, *Westw. Trans. Ent. Soc.* 1872, p. 94, pl. iii, fig. 2 ♂; *Moore* (Chilasa), *Lep. Ind.* vi, 1903, p. 88, pl. 505, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Papilio clytia, *ab.* papone, *Rothsch. Nov. Zool.* ii, 1895, p. 367.

Papilio casyapa, *Moore, P. Z. S.* 1879, p. 143; *id.* (Chilasa) *Lep. Ind.* vi, 1903, p. 84, pl. 502, figs. 1, 1 *a*-1 *b*, larva & pupa, ♂ ♀.

Papilio clytia, *ab.* casyapa, *Rothsch. Nov. Zool.* ii, 1895, p. 367.

Papilio clytia, *ab.* commixtus, *Rothsch. Nov. Zool.* ii, 1895, p. 367.

Chilasa commixta, *Moore, Lep. Ind.* vi, 1903, p. 89, pl. 505, figs. 2, 2 *a*, ♂.

Race lankeswara.

Papilio lankeswara, *Moore, P. Z. S.* 1879, p. 143; *id.* (Chilasa) *Lep. Ceyl.* i, 1881, p. 154, pl. 56, figs. 2, 2 *a*, 2 *b*, ♂ ♀, larva & pupa; *id.* (Chilasa) *Lep. Ind.* vi, 1903, p. 86.

Chilasa clytioides, *Moore, Lep. Ceyl.* i, 1881, p. 154, pl. 56, fig. 1 ♂.

Papilio clytia lankeswara & P. clytia lankeswara *ab.* clytioides, *Rothsch. Nov. Zool.* ii, 1895, p. 368.

Race panope.

Papilio panope, *Linn. Syst. Nat.* ed. x, 1758, p. 479.

Papilio onpape, *Moore, P. Z. S.* 1878, p. 840; *id.* (Chilasa) *Lep. Ind.* vi, 1903, p. 86, pl. 503, figs. 1, 1 *a*-1 *e*, ♂ ♀.

Papilio clytia panope, *Rothsch. Nov. Zool.* ii, 1895, p. 369.

Papilio clytia, *ab.* janus, *Fruhstorfer, Sitzung. Berl. Ent. Ver.* 1901, p. 22.

Chilasa janus, *Moore, Lep. Ind.* vi, 1903, p. 87, pl. 504, figs. 1, 1 *a*-1 *c*, ♂ ♀.

Race flavolimbatus.

Papilio dissimilis, *var.* flavolimbatus, *Oberthür, Études Ent.* iv, 1879, p. 101.

Papilio clytia flavolimbatus, *Rothsch. Nov. Zool.* ii, 1895, p. 370.

Chilasa flavolimbata, *Moore, Lep. Ind.* vi, 1903, p. 93, pl. 507, figs. 1, 1 *a*-1 *b*, ♂ ♀.

♂ ♀. *First form.—Upperside* velvety black or soft dark brown. Forewing: a subterminal series of outwardly truncate or emarginate white spots; the spot in interspace 4 shifted inwards out of line; those in interspaces 6, 7 and 8 oblique to the costa, the lowest and the upper two spots elongate; this is followed by a terminal series of smaller white spots, two in interspace 1, one above the other, and two in interspace 8; lastly, a single spot between the subterminal and terminal series. Hind wing: a discal series of inwardly conical and outwardly emarginate, triangular, elongate white spots in interspaces 1 to 5; a subterminal series of four white lunules in interspaces 2 to 5, the series continued on in interspaces 6 and 7 as transversely oblong white spots; a prominent tornal yellow spot broadly divided across the middle by a bar of the ground-colour. The cilia touched with white in the interspaces; sometimes one or more of these specks on the cilia are broad and prominent and yellow in colour. *Underside*: from soft pale brown to rich dark velvety-brown. Fore wing with the markings as on the upperside. Hind wing: the markings also similar to those on the upperside, but the terminal margin beyond the subterminal series of white markings bears a row of comparatively large very conspicuous yellow spots, separated from the white lunules by a series of short transverse detached spots of the ground-colour. Antennæ, head, thorax and abdomen black, the thorax anteriorly and beneath and the abdomen on the sides spotted with white.

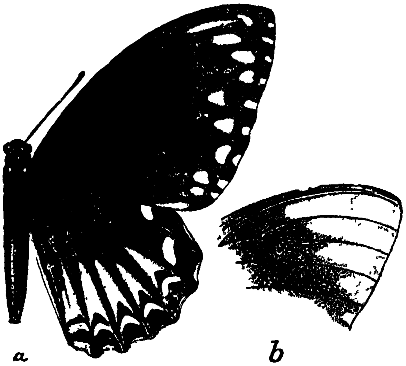

Fig. 18.
a. Papilio clytia, ♂. $\frac{2}{3}$.
b. Apical portion of fore wing: *P. clytia*, race *panope*.

♂ ♀. *Second form* (*dissimilis*, Doubleday).—Differs from the first form as follows:—*Upperside*, fore wing: cell with four streaks coalescent at base and four spots beyond at apex, a long streak in interspace 1 *a*, two streaks with two spots beyond which are more or less coalescent with them in interspace 1, a broad streak with an outwardly emarginate spot beyond in interspace 2, similar spots, one at base and one beyond, in 3, a single similar spot in 4, elongate streaks in 5 and 6, and much smaller elongate spots in interspaces 8 and 9. All these streaks and spots cream-white with diffuse edges; subterminal and terminal markings as in the first form. Hind wing: markings similar to those in the first form with the following differences:—discoidal cell entirely white, discal white streaks longer that reach quite up to the outer margin of the cell and are continued anteriorly to the costa by elongate streaks in interspaces 6 and 7, two spots in interspace 8 and a slender streak along the costa; the subterminal and terminal markings as in the first form. *Underside* similar to the upperside, the cream-white markings slightly larger, the terminal series of yellow spots on the hind wing as in the first form. Antennæ, head, thorax and abdomen as in the typical *clytia* form; the head, thorax and abdomen with more prominent white spots.

Exp. ♂ ♀ 108–121 mm. (4·26–4·76″).

Hab. The Himalayas from Kangra and Simla to Sikhim; Assam; Central and Southern India.

The larva and pupa are stated by Mackinnon (*t. c.*) to resemble closely the larva and pupa of *P. agestor*. Messrs. Davidson and Aitken's description of them is as follows:—

Larva. "Not unlike the larva of the *Ornithoptera* group in form, having similar rows of fleshy processes, but it is by far the handsomest *Papilio* larva we know, being of a dark umber-brown colour with a bright red spot at the base of each process, a dorsal row of large irregular yellow patches and a partial lateral row ending in a diagonal band which connects the two."

Pupa "is unique, exhibiting one of the most remarkable instances of protective resemblance we know. It exactly resembles a dead twig about an inch long and less than a quarter of an inch in diameter, broken off irregularly at one end. The last segment is so modified that the pupa is not attached by one point, but appears as if it had grown out of the branch to which it affixes itself."

Found on *Tetranthera apetala* and *Alseodaphne semicarpifolia.*

Var. *casyapa*, Moore.—"Fore wings, besides the marginal and submarginal markings, with a third discal series of one to five markings." (*Rothschild.*)

Var. *papone*, Westwood.—"Fore wings black, with an obvious bluish tint in certain lights; the white spots absent from the fore wings or only faintly indicated." (*Rothschild.*)

Var. *commixtus*, Rothschild.—"Fore wings black or bluish black, with a marginal, submarginal and a subdiscal series of most feebly-marked spots, and with two faint spots behind the cell and a streak along the inner margin [dorsum] white; the discal markings are often indicated by a few white scales, or are entirely absent. Hind wings with apical half of the cell, seven long discal streaks reaching the bases of the respective cellules [interspaces ?] (the first and the last reach the base of the wing) and a marginal and submarginal series of spots white as in ab. *dissimilis*, L. This aberration and examples intermediate between it and *clytia* I received from the Khasia Hills." (*Rothschild.*)

Race **lankeswara**, Moore.—"Differs from *P. clytia* in the umber-brown colour of the wings and in the small submarginal spots of the fore wings; from *P. clytia panope*, Linn., it is distinguished chiefly by the longer discal sagittiform spots of the hind wings. This subspecies has been described from slightly aberrant specimens in which the submarginal spots of the fore wings are partly obliterated; in most individuals the series of these spots is complete, and on such specimens Moore's *clytioides* is based." (*Rothschild.*)

The dimorph or *dissimilis* form of this race is identical with that of *P. clytia.*

Exp. ♂ ♀ 108–124 mm. (4·26–4·88").

Hab. Ceylon.

Race **panope**, Linn.—"The discal sagittate spots of the hind wings are shorter than in *P. clytia*, sometimes they have almost disappeared from the upperside. Most frequently the marginal and submarginal markings of the fore wings are more or less merged together, and form in the apex of the wing three large patches." (*Rothschild.*)

The dimorph or *dissimilis* form of this race also resembles that of the typical form.

Exp. ♂ ♀ 105–118 mm. (4·24–4·66").

Hab. Burma; Tenasserim; extending to Siam and the Malay Peninsula.

Var. *janus*, Fruhstorfer.—The subterminal and terminal white markings on the fore wings only faintly indicated or replaced by small black spots centred sometimes with obscure white. The white sagittate subterminal markings on the hind wing are in most specimens small and obscured by an irroration of dark scales.

Race **flavolimbatus**, Oberthür.—Closely resembles the *dissimilis* form of *clytia*; differs as follows:—♂ ♀ distinctly larger, the white markings similar but proportionately larger, with the exception of the streaks in the discoidal cells of both fore and hind wings, which are narrower and less firmly defined; on the hind wing there is a terminal row of ochraceous-yellow spots on the upper as well as on the underside, while those on the underside are very much larger than in *P. clytia*, dimorph *dissimilis*.

Exp. ♂ ♀ 124–130 mm. (4·9–5·12").

Hab. The Andamans.

The dark form *clytia* or any race of it is apparently unknown in the Andamans.

533. **Papilio paradoxus**, *Zinken-Sommer, Nov. Act. Ac. Nat. Cur.* xv, 1832, p. 162, pl. 15, figs. 9, 10.

Race telearchus (Pl. XII, fig. 87 ♀).

Papilio telearchus, *Hewitson, Trans. Ent. Soc.* (2) ii, 1852, p. 22, pl. 6, fig. 3 ♂; *Elwes & de Nicéville* (Papilio—Euplœopsis), *J. A. S. B.* 1886, p. 433; *de Nicéville, Jour. Bomb. N. H. Soc.* iv, 1889, p. 169, pl. A, fig. 5; *Moore* (Euplœopsis), *Lep. Ind.* vi, 1903, p. 96, pl. 511. figs. 1, 1 *a*–1 *c*, ♂ ♀.

Papilio paradoxus telearchus, *Rothsch. Nov. Zool.* ii, 1895, p. 375.

Race **telearchus**, Hewitson.—♂. *Upperside*: fore wing dark brown richly shot with blue, a short oval streak or large spot and a postdiscal and subterminal complete series of spots bluish white; both the series curve inwards on the wing anteriorly, the inner series of spots elongate. Hind wing rich hair-brown, with or without a subterminal series of white specks that increase in size anteriorly. *Underside* rich chocolate-brown. Fore wing: the cellular short streak faintly indicated, the postdiscal series of spots of the upperside not present, the subterminal series white, the spots much reduced in size. Hind wing: markings as on the upperside. Cilia dark brown alternated sparsely with white.

Antennæ black; head, thorax and abdomen velvety brown, the head and anterior portion of thorax and the thorax and abdomen beneath sparsely spotted with white.—♀. *Upperside*, fore wing: basal half dull brown, apical half brown shot with brilliant blue; markings as in the ♂, but larger and whiter, the spots in the postdiscal series more elongate. Hind wing brown, a series of comparatively broad whitish streaks in the cell and in all the interspaces, those in the latter end in a postdiscal series of whitish spots; beyond these a prominent subterminal series of whitish spots. Cilia brown, white in the middle of the interspaces. *Underside*: pale dull brown markings much as on the upperside, but larger, more diffuse, with the addition on the fore wing of whitish streaks in the cell and in the interspaces posteriorly. Antennæ black; head, thorax and abdomen blackish brown, more fully spotted with white than in the ♂.

The second and rarer form of the ♀ closely resembles the ♂, but is larger and paler, with the pale blue-glossed spots on the upperside of the fore wing elongate and more prominent and the ground-colour lighter than in the ♂.

Exp. ♂ ♀ 120–150 mm. (4·74–5·92").

Hab. Assam; Burma; Tenasserim, extending to Siam.

534. **Papilio caunus,** *Westwood, Cab. Or. Ent.* 1848, p. 20, pl. 9, figs. 2, 2*, ♂.

Race danisepa.

Papilio danisepa, *Butler, A. M. N. H.* (5) xvi, 1885, p. 343; *de Nicéville, Jour. Bomb. N. H. Soc.* ix, 1895, p. 366, pl. Q, fig. 48; *Moore* (Euplœopsis), *Lep. Ind.* vi, 1903, p. 98, pl. 512, figs. 1, 1*a*–1*c*, ♂ ♀.

Papilio caunus danisepa, *Rothsch. Nov. Zool.* ii, 1895, p. 377.

Race **danisepa,** Butler.—♂. *Upperside* rich velvety brown shot with blue. Fore wing: apical third of cell, four short streaks beyond in interspaces 4, 5, 6 and 9 and a subterminal series of spots curved inwards opposite the apex, bluish white. Hind wing: the cell, a series of streaks from the bases of interspaces 1 to 7 and an incomplete subterminal series of minute spots, white; the streaks in interspaces 4 and 5 short, those in the interspaces above and below gradually longer. *Underside* brown, without the blue gloss; markings as on the upperside, but the subterminal markings on the hind wing complete. Antennæ, head, thorax and abdomen black; beneath, the thorax and abdomen with a few white spots.—♀. Resembles the ♂, but the blue gloss on both fore and hind wing is more restricted, the ground-colour paler brown, somewhat of a rich golden-bronze, and the white markings are fuller and broader.

Exp. ♂ ♀ 110–132 mm. (4·34–5·2").

Hab. The hills of Assam; Arrakan; Upper and Lower Burma; Tenasserim, extending to Siam.

I first came across this magnificent butterfly on the Taunjah Pass, 1000 feet, over the Dawnat Mountains in Tenasserim, and until I had caught and examined it, mistook it for an extraordinarily large specimen of *Euplœa rhadamanthus.* It is apparently sometimes, notwithstanding its disguise, attacked and preyed on by the Pigmy Falcon (*Microhierax cærulescens*), as in the nest-hole of a pair of these birds I once found the fragment of a fore wing of a butterfly which was identified by the late Mr. de Nicéville as belonging to this form of *P. caunus.*

Elephenor Group.

♂ ♀. Shape of wings and neuration somewhat as in the *Protenor* group, but termen ot hind wing more deeply scalloped and proportionately somewhat broader. Fore wing in ♂ with secondary sexual characters on the upperside in the form of woolly adnervular stripes in the lower interspaces.

Key to the forms of the Elephenor *Group.*

a. Hind wing upperside: without any subterminal series of lunules .... *P. elephenor*, p. 80.

b. Hind wing upperside: with a subterminal series of purplish-blue lunules.................... *P. doddsi*, p. 81.

535. **Papilio elephenor,** *Doubleday, A. M. N. H.* xvi, 1845, p. 305; *Wood-Mason & de N.* (Papilio—Pangeranopsis), *J. A. S. B.* 1886, p. 374; *Doherty, J. A. S. B.* 1889, p. 130; *Rothsch. Nov. Zool.* ii, 1895, p. 378; *Moore* (Pangeranopsis), *Lep. Ind.* vi, 1903, p. 59, pl. 489, fig. 2 ♂.

♂. *Upperside*: dull black. Fore wing with an irroration of brilliant green scales that form cellular and internervular streaks. Hind wing: anterior half to nearly the median vein and above vein 5 irrorated with brilliant blue scales that become gradually sparse towards and cease entirely along the costal margin; posterior half irrorated with brilliant green scales; tornus with a small claret-red patch touched above with a few violet scales and also with an admarginal dusky black spot. Cilia brown alternated with white. *Underside* black. Fore wing with very broad and prominent cellular and internervular pale streaks, the costal margin and the basal half of interspaces 1 *a* and 1 distinctly black. Hind wing: a series of claret-red subterminal lunules, two side by side in each interspace, all more or less irrorated inwardly with violet scales; at the tornal angle these lunules form a conspicuous oblong patch that stretches a short way along the dorsum and bears a subbasal and a subapical black spot. Antennæ, the thorax and abdomen narrowly along the middle black; head pinkish red; abdomen on the sides buff-coloured.—♀. "Agrees with the ♂. The anal (tornal) red mark on the hind wings above is larger, rounded, marginal, and includes a small black spot, the outer margin (termen) of the hind wing is distinctly sinuate between the median veins (veins 2, 3, 4), and at the end of the upper median nervule (vein 4) produced into a short but obvious tooth as at the extremity of the lower discoidal vein (vein 5)." (*Rothschild.*)

Exp. ♂ 128–138 mm. (5·04–5·42″).

Hab. The hills of Upper Assam.

536. **Papilio doddsi** (Pl. XIII, fig. 88), *Janet, Bull. Soc. Ent. Fr.* 1896, p. 186; *de Nicéville* (Papilio—Sarbaria), *J. A. S. B.* 1897, p. 566, pl. 4, fig. 30 ♂; *Moore* (Pangeranopsis), *Lep. Ind.* vi, 1903, p. 60, pl. 489, fig. 3 ♂.

♂. Differs from *P. elephenor* ♂ as follows:—Wings proportionately slightly broader; termen of hind wing more deeply scalloped, more or less produced into broad teeth at the apices of the veins. *Upperside* (in the solitary specimen I have been able to examine) similar to the colouring in *elephenor*. Fore wing: anterior half velvety black without any irroration of green scales. Hind wing: the tornal ocellus as in *elephenor* but larger, a subterminal series of more or less purple-scaled lunules in interspaces 1 to 7. *Underside* as in *elephenor*, but on the hind wing the tornal red patch more restricted, with a single large black admarginal spot, the subterminal series of double red lunules more irregularly formed. Antennæ, head, thorax and abdomen as in *elephenor*.

Exp. ♂ 120 mm. (4·75″).

Hab. Upper Burma: Southern Shan States; Tonkin.

BIANOR GROUP.

♂ ♀. Fore wing broadly triangular; costa widely arched; apex produced but not acute, bluntly rounded; termen slightly oblique, tornus rounded; dorsum sinuous; cell slightly more than half length of wing. Male with well-marked woolly scent-streaks on outer portions of veins 1 to 4, or on some of them (always present on vein 1); these streaks not extended to the termen. Hind wing broad; costa arched; termen scalloped, produced at apex of vein 4 into a broad spatulate tail; tornal angle distinct; dorsum straight; abdominal fold moderate; cell comparatively short and narrow; subcostal vein and upper discocellular subequal. Antennæ not half length of fore wing, club gradual. Sexes alike, with conspicuous green and blue coloration on the upperside; an upper discal patch but no continuous broad green or blue band across hind wing.

Key to the forms of the Bianor *Group.*

a. Fore wing upperside: with no trace of a subterminal glistening green band .... *P. bianor*, p. 82.

b. Fore wing upperside: with a subterminal glistening green band, often more or less obsolescent anteriorly, but always indicated in the tornal region.

a'. Fore wing underside: without any prominent internervular greyish-white streaks except just near tornus .... *P. polyctor*, p. 82.

b'. Fore wing underside: with very prominent internervular greyish-white streaks, short near tornus, but gradually longer towards costal margin .... *P. polyctor*, race *ganesa*, p. 84.

537. **Papilio bianor**, *Cramer, Pap. Exot.* ii, 1777, p. 10, pl. 103, fig. C; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 110; *Rothsch. Nov. Zool.* ii, 1895, p. 378.

Papilio gladiator, *Fruhstorfer, Iris*, xi, 1901, pp. 370, 371; *id. Berl. ent. Zeit.* 1902, p. 184; *Moore* (Sarbaria), *Lep. Ind.* vi, 1903, p. 58, pl. 489, fig. 1.

♂ ♀. *Upperside* dull brownish black, much darker on the hind wing than on the fore wing. Fore wing irrorated somewhat sparsely with green scales, which in the ♂ tend to form green internervular streaks. Hind wing: basal three-fourths irrorated on the posterior half of the wing with green, on the anterior half with blue scales that leave a broad and uniform terminal and costal margin devoid of the irroration of blue or green scales; a subterminal series of lunules often incomplete, the anterior ones of blue scales, the posterior ones claret-red traversed by short inner lines of blue; the tornal lunule the widest. Cilia brown, in hind wing alternated with white. *Underside*: fore wing chocolate-brown; the cell with a slight irroration of yellowish scales; the outer half of the wing with broad pale internervular streaks that increase in length from the tornal angle to the costa, but do not reach the terminal margin. Hind wing deep brownish black, the base, cell and the disc partially with thin irroration of pale yellow scales; a conspicuous subterminal complete series of broad claret-red lunules traversed by short lines of violet-blue, and a series of terminal narrow transverse ochraceous spots in the interspaces. Antennæ, head, thorax and abdomen chocolate-brown; the head, thorax and abdomen above thinly sprinkled with green scales. ♀ similar, but larger and altogether paler.

Exp. ♂ ♀ 124–150 mm. (4·98–5·9").

Hab. China, except in the extreme north and south, extending within our limits into Burma and Tenasserim.

I have seen only two specimens of this form from Burma which, after careful comparison, I find can be exactly matched by specimens from China. It is a variable insect, however, and the points relied upon for separating it (under the name *gladiator*, Fruhst.), as a race of the Chinese *bianor*, are eminently variable.

538. **Papilio polyctor** (Pl. XIII, fig. 89, ♂), *Boisduval, Spec. Gén. Lép.* i, 1836, p. 205; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 109; *Rothsch. Nov. Zool.* ii, 1895, p. 381; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 594, pl. W, figs. 24 *a*–24 *c*, larva & pupa; *Moore* (Sarbaria), *Lep. Ind.* vi, 1903, p. 51, pl. 485, figs. 1, 1*a*, 1*b*, larva & pupa, ♂ ♀, and pl. 486, figs. 1, 1*a*, 1*b*, ♂ ♀.

Race ganesa.

Papilio ganesa, *Doubleday, Gray's Zool. Misc.* 1842, p. 73; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 107; *Elwes, Trans. Ent. Soc.* 1888, p. 428; *Moore* (Sarbaria), *Lep. Ind.* vi, 1903, p. 56, pl. 487, figs. 1, 1 *a*, ♂ ♀.

Papilio polyctor ganesa, *Rothsch. Nov. Zool.* ii, 1895, p. 383.

Papilio polyctor, *subsp.* triumphator, *Fruhstorfer, Soc. Ent.* 1902, p. 66.

Sarbaria triumphator, *Moore, Lep. Ind.* vi, 1903, p. 57, pl. 488, fig. 1 ♂.

Papilio polyctor, *subsp.* significans, *Fruhstorfer, Soc. Ent.* 1902, p. 66.

Sarbaria significans, *Moore, Lep. Ind.* vi, 1903, p. 57, pl. 488, fig. 2, ♂.

♂ ♀. The sexes are very nearly alike, and the difference slight between the dry-season and wet-season broods. *Upperside* dull black thickly irrorated with golden-green scales. Fore wing: a broad subterminal golden-green band that varies in length, but in all specimens is more or less diffuse and obsolescent towards the costal margin; in specimens of the wet-season broods this band is slightly broader than in those of the dry-season, also broader in the ♀ than in the ♂. Hind wing: the irroration of golden-green scales less dense, turning to blue on the anterior portions of the wing; a broad bright blue upper discal patch that stops well short of the termen, and has its outer margin uneven, occupies the base of interspace 4 and the outer portions of interspaces 5, 6, and 7; below, this patch is continued in interspaces 1 to 3 by much smaller diffuse quadrate spots of brilliant golden-green scales, that are prominent in wet-season forms, more obscure in the dry. The discal patch itself is variable in size; in some specimens there is only a trace of it in interspace 4. Tornus with a conspicuous subterminal claret-red lunule, traversed inwardly by an obscure blue line and edged above the lunule, narrowly, by velvety black; indications generally of a similar lunule in interspace 2; finally a terminal series of large velvety-black markings that form on the tail broad borders to the green irroration down its middle. Cilia broadly edged with white in the interspaces. *Underside* chocolate-brown, somewhat thinly irrorated with yellowish scales, which are absent however, from a more or less triangular patch in the middle of the fore wing posteriorly, but coalesce and form an ill-defined very short subterminal band just above the tornal angle of that wing. Hind wing: a conspicuous subterminal series of claret-red lunules each traversed inwardly by a line of purplish blue, followed by velvety-black spots and broad white terminal lunules. Antennæ, head, thorax and abdomen brownish black; the head, thorax and abdomen above, thinly irrorated with green scales.

Exp. ♂ ♀ 98–124 mm. (3·86–4·90″).

Hab. The Himalayas from Kashmir to Kumaon; Nepal.

Larva. Dull green with some yellowish markings, thorax with a remarkable shield-like covering projecting a little over the head and marked with slender involute black lines; 7th to the 12th segments with lateral obliquely placed pale yellowish lines.

Pupa. Pale green with yellow and white markings. Head cleft, back strongly arched; "sides flattened out with a hard sharp ridge running longitudinally round the whole insect." (*Harford*, as quoted by Moore.)

Race **ganesa**, Doubleday.—The Eastern race as a whole is larger and typically differs as follows:—*Upperside*: ground-colour slightly darker, irroration of green scales not so dense. Fore wing: the subterminal bright golden-green transverse band very incomplete, often merely indicated from near the tornus to not further than interspace 3. Hind wing: the upper discal patch not continued to the dorsum, the red subterminal lunules on the posterior half of the wing more generally present. *Underside*: ground-colour darker than in the Western race. Fore wing with very prominent internervular whitish streaks on the outer half, these streaks increase in length towards the costa but do not reach the terminal margin. Hind wing: the irroration of yellowish scales less dense and more restricted, the series of subterminal red and of terminal whitish lunules as in *polyctor* but variable, especially the latter series, in width and prominence. Antennæ, head, thorax and abdomen as in *polyctor*.

Exp. ♂ ♀ 123–140 mm. (4·84–5·5").

Hab. Sikhim; Nepal; the hills of Assam, Burma and Tenasserim.

The Assam and Burmese specimens have been separated as subspecies or races by Fruhstorfer under the names *triumphator* and *significans*; the points relied upon for distinguishing them are, however, eminently variable, such as the width or entire obsolescence of the subterminal green band on the upperside of the fore wing, the size of the upper discal patch and the presence or absence of red subterminal lunules on the upperside of the hind wing. These all vary greatly in Sikhim as well as in Assam and Burmese specimens. The presence of a somewhat obscure shining white spot on the upperside of the fore wing near the tornal angle in *significans*, if constant, may possibly entitle it to racial separation.

PARIS GROUP.

♂ ♀. In arrangement of pattern and in venation closely resembles the *Bianor* group, but the males are devoid of the cottony scent-streaks on the upperside of the fore wing.

Key to the forms of the Paris *Group.*

a. Fore wing underside: subterminal greyish-white band sharply defined, narrow, of even width throughout .... *P. krishna*, p. 86.

b. Fore wing underside: subterminal greyish-white band not sharply defined, broad and gradually widened anteriorly.
  a'. Hind wing upperside: without a subterminal series of claret-red lunules.
    a^2. Hind wing upperside: upper discal blue or green patch does not extend down to vein 3 .... *P. paris*, p. 85.
    b^2. Hind wing upperside: upper discal blue or green patch larger, extends down to vein 3 .... *P. paris*, race *tamilana*, p. 86.
  b'. Hind wing upperside: with a prominent subterminal series of claret-red lunules.... *P. arcturus*, p. 87.

539. **Papilio paris** (Pl. XIII, fig. 90, ♂), *Linn. Syst. Nat.* ed. x, 1758, p. 459; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 107; *Elwes, Trans. Ent. Soc.* 1888, p. 427; *Manders, Trans. Ent. Soc.* 1890, p. 535; *Rothsch. Nov. Zool.* ii, 1895, p. 384; *Moore* (Achillides), *Lep. Ind.* vi, 1903, p. 64, pl. 491, figs. 1, 1 *a*-1 *c*, ♂ ♀.

Race tamilana.

Papilio tamilana, *Moore, Trans. Ent. Soc.* 1881, p. 313; *Davidson, Bell & Aitken, Jour. Bomb. Nat. Hist. Soc.* x, 1897, p. 581; *Moore* (Achillides), *Lep. Ind.* vi, 1903, p. 65, pl. 492, figs. 1, 1 *a*, ♂ ♀.
Papilio paris tamilana, *Rothsch. Nov. Zool.* ii, 1895, p. 385.

♂. *Upperside* black, irrorated with dark green scales, which on the outer portion of the fore wing coalesce and form an incomplete postdiscal narrow band more erect than the subterminal similar band on the fore wing of *P. polyctor*. Hind wing: the irroration of dark green scales does not extend to the costal margin and is interrupted posteriorly by a broad postdiscal area, on both sides of which the green scales coalesce to form narrow diffuse bands; a conspicuous upper discal shining blue patch occupies the base of interspace 4 and outer portions of interspaces 5 and 6; this patch is variable in size, and in many specimens extends narrowly below and above into interspaces 3 and 7 respectively, its outer margin is uneven, its inner margin evenly arched; a prominent claret-red largely black-centred ocellus at the tornal angle, its inner margin with a transverse short violet-blue superposed line; in many specimens an obscure claret-red subterminal lunule in interspace 7. *Underside* opaque black; bases of both fore and hind wings, up to basal half of cell in fore and up to apex of cell in hind wing, with an irroration of yellowish scales; also present more obscurely on the subterminal area in both wings. Fore wing with a very broad elongate triangular pale area that does not extend to the termen, formed of internervular broad very pale ochraceous-white streaks, short near the tornus, gradually longer up to the costa. Hind wing: a prominent subterminal series of ochraceous-red lunules traversed by short violet-blue lines; in interspaces 1, 2, and sometimes in 3, these lunules are formed into more or less complete largely black-centred ocelli by the addition of an admarginal portion of the red ring. Cilia conspicuously white in the interspaces. Antennæ, head, thorax and abdomen black, the latter three sprinkled with green scales above.—♀. Similar, somewhat paler and duller. *Upperside*: fore wing with the green postdiscal band shorter and still more incomplete. Hind wing with the upper discal patch smaller, often green and not blue, the red subterminal lunule in interspace 7 always present and more prominent than in the ♂. *Underside*: similar to that in the ♂, but the tornal and subtornal markings generally formed into more or less complete ocelli.

Exp. ♂ ♀ 106–132 mm. (4·18–5·2″).

Hab. The Himalayas from Kumaon to Sikhim, Nepal and Bhutan; the hills of Assam, Burma and Tenasserim, extending to China, Siam and the Malay Peninsula. A common insect in Sikhim, where it is found from the Terai up to 5000 feet. It is rare in Burma and Tenasserim, where I have taken it in the Thaungyin and Ataran Valleys from May to October, but it has been recorded from various places from Bhamo to Tavoy.

Race **tamilana**, Moore.—Very closely resembles the typical form, but on the *upperside* the upper discal patch on the hind wing is of a paler more metallic blue and very considerably larger, it extends from interspace 3 well into interspace 7, from the apex of the cell into interspaces 3, 4, and 5, and from the middle of interspace 6 much further towards the termen than in *paris*. *Underside* similar to that of the typical form, but the transverse postdiscal pale band on the fore wing is conspicuously narrower and curved inwards towards the costa. Antennæ, head, thorax and abdomen as in *paris*.

Exp. ♂ ♀ 116–134 mm. (4·58–5·28″).

Hab. Southern India: Kanara, Nilgiris, Travancore.

Mr. Bell "observed the female laying eggs on *Erodia roxburghiana*."

540. **Papilio krishna**, *Moore*, *Cat. Lep. Mus. E. I. C.* i, 1857, p. 108, pl. 2 *a*, fig. 6 ♂; *Elwes*, *Trans. Ent. Soc.* 1888, p. 427; *Rothsch. Nov. Zool.* ii, 1895, p. 384; *Moore* (Achillides), *Lep. Ind.* vi, 1903, p. 63 pl. 490, fig. 2 ♂.

♂ ♀. Resembles *P. paris* generally, but differs in many points as follows:—*Upperside*: ground-colour more of a brownish black, irrorated similarly to *paris* with green scales, but the scales smaller and more sparsely spread. Fore wing: the postdiscal transverse band well-defined, complete, formed of white scaling with only a thin sprinkling of green scales on its inner margin, generally erect or slightly curved, rarely slightly sinuous. Hind wing: upper discal patch metallic greenish blue, smaller than in *paris*, but the portions of it in interspaces 6 and 7 more extended towards the termen, the metallic golden-green band that joins the patch on its inner side to the dorsal margin more conspicuous than in *paris*; the tornal ocellus as in *paris*, but above it a subterminal series of claret-red lunules in interspaces 2, 3, 4 and 5, followed by a series of ochraceous-red obscure terminal narrow lunules in the interspaces, the cilia on the outer margin of each conspicuously white. *Underside*: fore wing as in *paris* but an erect ochraceous-white postdiscal band as on the upperside limits; the series of internervular pale streaks on the outer half of the wing. Hind wing: a well-defined discal ochraceous-white band formed of a series of somewhat lunular marks in the interspaces, these increase in width anteriorly; a subterminal series of claret-red lunules traversed by violet scaling on the inner side as in *paris*, but much broader and more prominent; finally a terminal series of ochraceous-yellow lunular marks in the interspaces; the cilia that border each lunule white. Antennæ, head, thorax and abdomen as in *P. paris*.

Exp. ♂ ♀ 108–121 mm. (4·24–4·75″).

Hab. Recorded from Sikhim and Bhutan only.

In Sikhim it is recorded by Mr. Elwes as common "in some seasons at certain places, and found from 3000 to 9000 feet elevation." I procured several specimens at Rungarun, near Darjiling, in May. It was difficult to catch, and only one or two of the specimens were in good condition.

541. **Papilio arcturus**, *Westwood, A. M. N. H.* ix, 1842, p. 37; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 108; *Rothsch. Nov. Zool.* ii, 1895, p. 383; *Moore* (Achillides), *Lep. Ind.* vi, 1903, p. 61, pl. 490, fig. 1 ♂.

♂. *Upperside* brownish black, somewhat paler on the fore than on the hind wing. Fore wing irrorated with brilliant golden-green scales that on the posterior half of the wing form a broad, not well-defined subterminal band; the veins and elongate streaks between them on the outer half of the wing velvety black. Hind wing: posterior three-fourths irrorated with brilliant golden-green scales as on the fore wing but towards the base anteriorly these turn to blue; a conspicuous brilliant blue patch somewhat irregular in shape occupies the apex of the cell and the bases of interspaces 5 and 6, prolonged as a broad streak in the latter interspace up to the terminal margin; below this a more or less triangular patch on the disc and above it the whole of the costal margin broadly are devoid of the irroration of green scales; a subterminal generally incomplete series of large claret-red lunules terminates at the tornal angle in a large conspicuous black-centred red ocellus; the latter is encircled above and anteriorly by a narrow band formed by a conflux of the green irrorated scales; the lunules are bordered outwardly by spots of the ground-colour that are devoid of the green scales; finally both the lunules and the tornal ocellus are tinged more or less with bluish-purple on their inner margins. *Underside* dull black, with a somewhat sparse irroration of yellowish-white scales confined on the fore wing to the base and apex, and on the hind wing to the posterior two-thirds, not extended to the termen except along the tail. Fore wing: a broad ill-defined subterminal pale transverse area, crossed by the black veins and internervular streaks, and elongated pale cellular streaks. Hind wing: a large somewhat quadrate terminal black-centred claret-red patch in interspaces 1 and 2, and a subterminal series of broad claret-red lunules that extends from interspaces 3 to 7, followed by ill-defined anteciliary red spots in each interspace. Cilia of both fore and hind wings white, alternated with black. Antennæ, head, thorax and abdomen brownish black; the head, thorax and abdomen at base on the upperside sprinkled with golden-green scales.—♀ similar, the markings more prominent. *Upperside*: on the fore wing the subterminal golden-green band broader, on the hind wing the subterminal series of claret-red lunules more complete.

Exp. ♂ ♀ 119–126 mm. (4·70–4·98").

Hab. The Himalayas from Murree to Sikhim; Bhutan; Assam; Burma; Tenasserim.

This lovely butterfly is rare in Tenasserim. Mr. Hauxwell and I procured it on the Taoo plateau at 4000 feet.

Palinurus Group.

♂ ♀. Differs from the *Bianor* group, in that the males, except in one form (*P. crino*), are devoid of the cottony scent-streaks on the upperside of the fore wing. Even in the exceptional form these streaks are only sometimes present in the males; when present such streak is invariably absent from interspace 1. Both fore and hind wings on the upperside crossed by bright bluish-green bands; the band on the fore wing from the costa obliquely outwards, that on the hind wing from the costa obliquely inwards.

Key to the forms of the Palinurus *Group.*

a. Hind wing upperside: tail without any green scaling on spatular portion
  a'. Fore wing upperside: green band across wing comparatively narrow; measured on dorsum less than one-third length of latter: expanse 92–102 mm. .... *P. palinurus*, p. 88.
  b'. Fore wing upperside: green band across wing comparatively broad, measured on dorsum considerably more than one-third length of latter: expanse 107–115 mm. .... *P. buddha*, p. 89.
b. Hind wing upperside: tail with a patch of green scales on spatular portion .... *P. crino*, p. 90.

542. **Papilio palinurus** (Pl. XIII, fig. 91), *Fabr. Mant. Ins.* ii, 1787, p. 2; *Rothsch. Nov. Zool.* ii, 1895, p. 387; *Moore* (Harimala), *Lep. Ind.* vi, 1903, p. 71, pl. 495, figs. 1, 1 *a*, 1 *b*, ♂ ♀.
Papilio brama, *Guér. Rev. Zool.* 1840, p. 43, pl. 1, figs. 3, 4; *Gray, Cat. Lep. Ins. B. M.* i, 1852, p. 18; *Dist. Rhop. Malay.* 1885, p. 338, pl. 32, fig. 4 ♂.

♂. *Upperside* black, closely irrorated with brilliant green scales.

Fore wing with a slightly excurved, oblique, bright green discal band that extends from the middle of the costa to the dorsum a little before the tornal angle; measured on the dorsum the width of this band is nearly equal to one-third of the length of the dorsal margin; anteriorly the band passes through the apical fourth of the cell and is narrowed slightly at the costa. Hind wing: costal margin broadly, termen including the tail more narrowly, devoid of the irroration of green scales; a broad discal bar, elongate-oval in shape, extends from the dorsum a little above the tornus to the middle of interspace 6, its outer margin diffuse; this is followed by a postdiscal area where the irroration of green scales is sparser than at the base, and a subterminal series of very broad lunules formed of scales of similarly metallic coloration; finally a dark ochraceous-brown ocellus centred with black and surmounted by blue at the tornal angle, and a paler ochraceous-yellow lunule subapically in interspace 7. *Underside* velvety brownish-black; bases of both fore and hind wings somewhat thickly, the outer portions more thinly, sprinkled with pale yellow scales. Fore wing: apical half obliquely pale brownish white, darkening to dusky black at the apex and narrowly along the termen; the pale area very narrow at the tornal angle, gradually broadened up to the costa, traversed by the black veins. Hind wing: uniform; an outer narrow pale band traversed by a subterminal series of ochraceous-brown lunules that are bordered on both inner and outer sides by velvety black, the black on the innerside crossed by diffuse short lines of bluish-white scales; the lunule in interspace 7 broadly and conspicuously bordered inwardly with white. Antennæ, head, thorax and abdomen velvety black, the head and thorax above overlaid with green.—♀. Differs from ♂ in the discal transverse bands on the upperside of the fore and hind wings, which are conspicuously narrower, and on the hind wing by the brighter ochraceous colour of the tornal ocellus.

Exp. ♂ ♀ 92–102 mm. (3·62–4″).

Hab. Within our limits the hills of Burma and Tenasserim. Found also in the Malay Peninsula, Sumatra and Borneo. Rare in Burma and Tenasserim. I took one specimen in the Ruby Mines district in Upper Burma at 5000 ft. elevation, and others in the Yunzalin and Haungtharaw Valleys in Tenasserim. Mr. Hauxwell records the following note:—“This butterfly has the habit of bathing in shallow water in hill streams. It skims the surface of the water like a swallow and dips its body into the water, giving itself a shake as it comes out and then flies on again.” (Jour. Bomb. N. H. Soc. xii, 1899, p. 335.)

543. **Papilio buddha,** *Westwood, Trans. Ent. Soc.* 1872, p. 86, pl. 3, fig. 1 ♂; *Rothsch. Nov. Zool.* ii, 1895, p. 389; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 581, pl. 6, figs. 2, 2 *a*, larva & pupa; *Moore* (Harimala), *Lep. Ind.* vi, 1903, p. 69, pl. 494, figs. 1, 1 *a*–1 *c*, ♂, larva & pupa, ♂ ♀.

♂ ♀. Resembles *P. palinurus* but is larger and also differs as follows:—*Upperside*: irroration of green scales more restricted, the outer half of the fore wing except a triangular patch from apex of wing downwards, and the outer third of the hind wing except a subterminal series of ill-formed lunules, devoid of green scales; discal transverse bands on both fore and hind wings similar to those in *P. palinurus* but very much broader; the discal band of the fore wing measured on the dorsum occupies considerably more than one-third of the dorsal length, while the discal band of the hind wing is as broad posteriorly as it is anteriorly (in *P. palinurus* it is much narrower posteriorly); the ochraceous tornal ocellus brighter, not surmounted with blue; the subapical ochraceous lunule in interspace 7 also brighter and much larger. *Underside* similar to the underside in *P. palinurus*, but on the hind wing the ochraceous lunules in the subterminal series proportionately narrower and much more conspicuously bordered on their innersides with silvery white. Antennæ, head, thorax and abdomen as in *P. palinurus*.

Exp. ♂ ♀ 107–155 mm. (4·2–4·5″).

Hab. Southern India.

Larva. Thoracic segments with a shield. Green, the shield laterally and posteriorly narrowly edged with white; segments 5 to 11 with a broad white line and above it a series of minute white spots one on each segment.

Pupa. Much curved ventrally, head cleft, the processes long and upturned, back and sides keeled; colour dark green ventrally, pale green dorsally. (After *Davidson & Aitken.*)

544. **Papilio crino**, *Fabr. Ent. Syst.* iii (1) p. 5; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 109; *Rothsch. Nov. Zool.* ii, 1895, p. 389; *Moore* (Harimala), *Lep. Ind.* vi, 1903, p. 67, pl. 493, figs. 1, 1 *a*–1 *d*, larva & pupa, ♂ ♀.

Papilio crino, *var.* montanus, *Felder, Verh. zool.-bot. Ges. Wien*, xiv, 1864, pp. 322, 370.

Harimala montanus, *Moore, Lep. Ceyl.* i, 1881, p. 146, pl. 61, fig. 1 ♀.

♂ ♀. Resembles *P. palinurus*, but the ♂ generally has on the upperside of the outer half of the fore wing cottony or hairy scent-streaks similar to those in *P. polyctor*, only the streak in interspace 1 is always wanting. Other differences are as follows:—

♂ ♀. *Upperside*, fore wing: the discal transverse bluish-green band slightly sinuous, narrower, more curved and more distinctly decreasing in width towards the costal margin; in the ♀ more sinuous than in the ♂. Hind wing: the transverse bluish-green band very variable in width but with its inner margin much straighter than in *P. polyctor*; this band that in *P. polyctor* stops short of vein 7, is in the present form continued to the costal margin, it is however much and abruptly narrowed above vein 7; tornal ocellus claret-red with a large black centre inwardly edged with blue; the bright ochraceous subapical lunule of *P. polyctor* replaced by a dull whitish spot; the subterminal diffuse green lunules restricted to interspaces 2, 3, and 4; the spatular apex of the tail with a small patch of bluish-green scales. *Underside* dull pale brown to blackish brown irrorated with scattered yellowish scales, which, however, on the fore wing are absent from a large triangular discal patch that lies between the dorsum, the median vein, vein 5 and a line of white lunules that crosses the wing in an outward curve from the upper third of the costa to just before the tornus; these white lunules are outwardly diffuse and merge gradually into the brown ground-colour. Hind wing: the tornal ocellus much as on the upperside; an obscure ill-defined highly arched postdiscal narrow whitish band from above the tornal ocellus to the costa, ends near apex of interspace 7 in a broad white lunule; beyond this a double subterminal row of somewhat straight ochreous-white lunules in the interspaces, each lunule of the inner row bordered outwardly with blue, this bordering very faint in many specimens. Cilia of both fore and hind wings brown alternated with white. Antennæ, head, thorax and abdomen dark brownish black; the head, thorax, and abdomen above with a sprinkling of glittering green scales.

Exp. ♂ ♀ 100–116 mm. (3·98–4·6″).

Hab. Lower Bengal; Central and Southern India; Ceylon.

Var. *montanus*, Felder, was founded on specimens devoid of the cottony scent-streaks on the upperside of the fore wing.

Larva. "Somewhat limaciform; anterior segments convexly scutellated; furnished with a pair of short fleshy tubercles on anterior and two on anal segments." (*Moore.*)

Pupa. "Curved backward anteriorly; head broad in front; green." (*Moore.*)

Payeni Group.

♂ ♀. Fore wing more or less strongly falcate; costa much arched, apex acute or subacute, produced; termen concave; tornus well marked, angular; dorsum sinuous; cell broad, upper discocellular about half the length of middle, middle concave; veins 9, 10 and 11 very close to each other, out of subcostal. Hind wing subtriangular; costa slightly arched, apex rounded; termen slightly convex to vein 4, prolonged into a long spatulate tail, slightly curved upwards at vein 4; tornus oblique, not well marked; dorsum straight; cell very long, more than two-thirds of length of wing to apex. Antennæ comparatively short, not half length of fore wing; club well marked, oval. Anal valves in ♂ distinct.

Key to the forms of the Payeni *Group.*

a.	Upperside ground-colour ochraceous yellow	*P. evan*, p. 91.
b.	Upperside ground-colour brown	*P. gyas*, p. 92.

545. **Papilio evan** (Pl. XIV, fig. 92), *Doubleday, A. M. N. H.* xvi, 1845, pp. 235 & 304; *Moore* (Meandrusa), *New Ind. Lep. Ins.* 1888, p. 284; *id.* (Meandrusa), *Lep. Ind.* vi, 1903, p. 47, pl. 483, figs. 1, 1*a*–1*c*, ♂ ♀.

Papilio payeni evan, *Rothsch. Nov. Zool.* ii, 1895, p. 401.

♂. *Upperside* bright ochraceous, with a darker shade towards the base of the wings. Fore wing: two or three spots obliquely across the cell, a larger spot at its upper apex, the costal margin from base (the collar broadened towards the apex), and the terminal margin very broadly, dark brown; on the inner side of this broad brown terminal edging there is a transverse incomplete discal series of dark brown spots, followed by an irregular transverse series of brown lunules, both these merge anteriorly and posteriorly into the brown on the termen; lastly superposed on the brown terminal edging is a more or less complete, transverse, subterminal series of lunules of the ochraceous ground-colour, reduced in some specimens to only two or three lunules above the tornus. Hind wing: terminal half or more dark brown, with an inner postdiscal and an outer subterminal series of more or less lunular spots of the ochraceous ground-colour; the postdiscal series consists of only four spots in interspaces 1 to 4, the subterminal series is complete to interspace 7, the spots larger, that in interspace 3 elongate, outwardly conical; tail tipped with ochraceous. *Underside*: ground-colour a deeper richer ochraceous. Fore wing: cell and basal area with a number of irregular cinnamon-brown spots, followed on the terminal half by three transverse series of more or less irregular and incomplete lunular cinnamon-brown markings and a narrow brown terminal edging. Hind wing: basal area with a transverse series of three spots, a large spot at apex of cell, the bases of interspaces 1, 2 and 3, followed by three more or less complete but irregular series of lunular markings, cinnamon-brown; superposed on the inner discal row of brown lunules is a transverse series of snow-white crescents, conspicuous only in interspaces 1 and 2, but barely indicated anteriorly. Antennæ dark ochraceous brown; head, thorax and abdomen ochraceous, the thorax posteriorly and basal half of the abdomen olivaceous; beneath: head, thorax and abdomen brighter ochraceous. — ♀. Ground-colour paler, base and cell of fore wing on upperside shaded with bright very pale cinnamon; markings similar both on the upper and under sides, but less clearly defined; the costal margin of fore wing on the upperside ochraceous almost to apex, not brown; the subterminal series of ochraceous lunules on the upperside of the hind wing very large, separated from one another only by the brown along the veins. Antennæ, head, thorax and abdomen similar, but paler.

Exp. ♂ ♀ 108–146 mm. (4·23–5·72").

Hab. Sikhim; Bhutan; Assam; Burma; Tenasserim.

546. **Papilio gyas**, *Westwood, Arcana Ent.* i, 1841, p. 41, pl. 11, fig. 1, ♂; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 110; *Rothsch. Nov. Zool.* ii. 1895, p. 401; *Moore* (Dabasa), *Lep. Ind.* vi, 1903, p. 49, pl. 484, figs. 1, 1*a*, 1*b*, ♂ ♀.

♂. *Upperside* opaque brown, the basal area and the terminal third of both fore and hind wings of a darker shade than the broad medial area, due to the dark markings of the underside that show through by transparency; fore and hind wings with a subterminal series of largish yellow lunules that curve upwards posteriorly on the hind wing and end in a diffuse transverse bluish-white mark across interspace 1. *Underside*, fore wing: basal third and a large spot on the discocellulars, that is widened anteriorly, rich dark cinnamon-brown; medial third lilacine, pale towards the dorsum, widened anteriorly and extended into the apex of the cell, and on the costa from the discocellulars to near the apex of the wing; interspaces 2, 3 and 4 with paler lilacine lunules; terminal third of the wing dull brown, with a postdiscal and a subterminal transverse series of somewhat obscure olivaceous-yellow lunules. Hind wing: basal third rich dark cinnamon-brown in continuation of that colour on the fore wing; remainder of the wing lilacine, with a large posterior discal patch of cinnamon-brown, margined inwardly by a diffuse broad irregular white band, and outwardly by a series of white lunules; a subterminal somewhat obscure row of olivaceous-yellow markings; the tail and terminal margin dark cinnamon-brown. Antennæ dark brown, head, thorax and abdomen brown with an olivaceous tinge; beneath: similar, the abdomen more brightly olivaceous yellow.—♀. *Upperside*: ground-colour similar to that in the ♂; markings differ as follows:—a very broad discal transverse lilacine white band across both fore and hind wings that extends from vein 5 and from within the apex of cell of fore wing to the dorsal margin of the hind wing. Fore wing: a yellowish-white costal spot in upper third of cell, a larger spot beyond that turns to yellow at base of interspace 6, an anterior postdiscal transverse series of yellow more or less lunular spots, and a subterminal similar series of spots. Hind wing: the lilacine white colour of the discal band spreads to the base of the wing, but is thickly irrorated with brownish scales, as is also the outer margin posteriorly of the same band; the rest of the wing dark brown, with the margins of the tornus and of the tail broadly bright cinnamon-brown; lastly, superposed on the brown area is a subterminal series of large, yellow, well-defined more or less lunular spots. *Underside* similar to that of the ♂, the ground-colour and markings on the outer two-thirds of both fore and hind wings paler. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 120–126 mm. (4·73–5·0″).

Hab. Sikhim; Bhutan; Assam; Burma; Tenasserim.

Glycerion Group.

♂ ♀. Fore wing broadly triangular; costa somewhat broadly arched; apex obtuse; termen straight; tornus rounded; dorsum straight, considerably more than half length of costa; cell longer than half length of wing, upper discocellular more than twice as long as middle; vein 11 very short, anastomosed with vein 12 very soon after its origin. Hind wing broad; costal and terminal margins subequal, the latter sinuous, with a delicate and very slender non-spatulate tail at apex of vein 4; the wing posterior to the tail produced inwardly, lobed and emarginate below the tornus;

dorsum straight; cell narrow, upper discocellular very much longer than the middle. Antennæ short, not half length of fore wing: club well marked, thick, but gradual; head tufted in front, thorax and legs hairy.—♂ abdominal fold of hind wing narrow, without any cottony scent-hairs within.

547. **Papilio glycerion**, *Gray, Zool. Misc.* 1831, p. 32; *id. Lep. Ins. Nep.* 1846, p. 4, pl. 3, fig. 2; *Moore, Cat. Lep. Mus. E. I. C.* i 1857, p. 116; *Heron, A. M. N. H.* (7) iii, 1899, p. 119; *Moore* (Pazala), *Lep. Ind.* vi, 1903, p. 33, pl. 479, figs. 1, 1*a*, 1*b*.
Papilio paphus, *de Nicéville, J. A. S. B.* 1886, p. 254, pl. 11, fig. 6, ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 432.
Papilio mandarinus paphus, *Rothsch. Nov. Zool.* ii, 1895, p. 408.

♂ ♀. *Upperside* dead-white or very pale cream-colour. Fore wing: cell partially, and interspaces between the dusky black outer discal markings more or less semitransparent; cell crossed by five black bands, the basal two of which extend to the dorsal margin, the subapical to a little below the median vein; a black band along the discocellulars, joined at costal margin and above lower apex of cell to the band traversing the cell near its apex; a broad transverse postdiscal black band from near tornal angle to costa; this band double above vein 5, forms three well-marked loops; subterminal and terminal narrower transverse black bands, the former joined on to the postdiscal band near tornal angle; lastly, the postdiscal band outwardly and the terminal band inwardly, broadly and diffusely bordered with dusky black. Hind wing: a narrow black line from base along the dorsum, a broader black line along vein 1, joined below the cell by a broad black band that crosses the latter subbasally, a black patch on the produced posterior portion of the wing, studded at the tornal angle with two conspicuous yellow spots, below which there is a triangular white dorsal mark; the black patch with three somewhat obscure blue subterminal lunules; the tail narrowly edged with white; a narrow black medial line from costa that crosses near apex of cell and terminates on the median nervure; at the upper and lower ends of this are loops formed of slender black lines, in the ♀ well marked, in the ♂ seen only by transparency from the underside; finally, discal, postdiscal and subterminal slender black transverse lines from the costa terminate in the black anal patch. *Underside* similar, with similar but much more heavily defined black markings, the upper or costal loop on the short medial transverse black line tinged with yellow; the whole of the median vein and the discocellulars broadly defined in black. Antennæ black; head, thorax and abdomen black, with some white pubescence, the head anteriorly tufted with black; head, thorax and abdomen beneath whitish yellow.

Exp. ♂ ♀ 77–90 mm. (3–3·52″).

Hab. Sikhim; Nepal; Upper Burma: N. Chin Hills?

It is, I think, probable that the one specimen procured in the Chin Hills by Capt. Watson belonged to the Eastern race of the closely allied *P. kashmirensis*, Rothsch., and not to *P. glycerion*.

548. **Papilio kashmirensis**, *Rothschild.*

Papilio glycerion, *S. Robson* (*nec Gray*), *Jour. Bomb. N. H. Soc.* ix, 1895, p. 497, larva & pupa.

Papilio glycerion cashmirensis, *Rothsch. Nov. Zool.* ii. 1895, p. 407; *Mackinnon & de Nicéville, Jour. Bomb. N. H. Soc.* xi, 1898, p. 595, pl. W, figs. 25*a*–25*c*, larva & pupa.

Papilio caschmirensis, *Heron, A. M. N. H.* (7) iii, 1899, p. 120; *Moore* (Pazala), *Lep. Ind.* vi, 1903, p. 36, pl. 480. figs. 1, 1*a*–1*d*, larva & pupa, ♂ ♀.

Race sikhimica.

Papilio glycerion, *de Nicéville* (*nec Gray*), *J. A. S. B.* 1886, p. 254, pl. 11, fig. 5; *Elwes* (*nec Gray*), *Trans. Ent. Soc.* 1888, p. 432.

Papilio caschmirensis, *subsp.* sikkimica, *Heron, A. M. N. H.* (7) iii, 1899, p. 120.

Pazala sikkima, *Moore, Lep. Ind.* vi, 1903, p. 35, pl. 479, figs. 2, 2*a*, 2*b*, ♂ ♀.

Closely resembles *P. glycerion*, but can be distinguished as follows:— *Upperside*, fore wing: postdiscal transverse band not extended to dorsum, but terminated above vein 1; all the black transverse markings narrower. Hind wing: the black patch on the produced posterior portion of the wing proportionately of less extent; the black band that crosses the cell subbasally and the lower portions only of the discal, postdiscal and subterminal black lines as in *P. glycerion*; the rest of the transverse black linear markings obsolete, seen only by transparency from the underside. *Underside*, fore wing: markings as on the upperside but more heavily defined. Hind wing with an additional black transverse line beyond the medial line, connected with it by lines of black along the veins, that form a series of loops which are more or less tinted with pale yellow. Antennæ, head, thorax and abdomen as in *P. glycerion.*

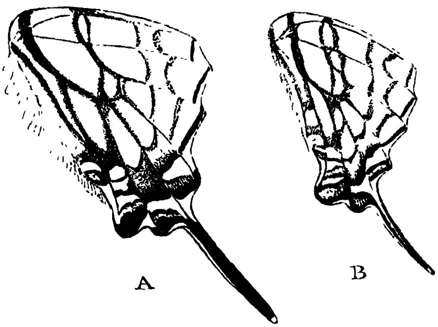

Fig. 19.—Hind wing undersides:
A. *Papilio glycerion.*
B. *Papilio kashmirensis.*

Exp. ♂ ♀ 66–71 mm. (2·6–2·8″).

Hab. The Himalayas: Kashmir to Mussoorie.

Larva. " When full-fed 1⅛–1¼ inches in length; 4th and 5th segments thickest; from 5th segment to 13th the larva tapers. Colour green. . . . . covered with minute black dots except on anal segment. Third segment bordered anteriorly by a narrow ochreous ridge, which surmounts the head when drawn in, and is continued in unbroken spiracular lines to the tail. This ridge or hood is furnished with two short, blunt, black subdorsal spines. The 4th and 5th segments are furnished each with two subdorsal vermilion tubercles armed with a short black spine. Last segment bifurcate, the points yellow, tipped with black. . . . . . Legs, claspers and abdomen of a whitish green." (*Mrs. S. Robson.*)

Pupa. "One inch long; brighter green than the larva, marked longitudinally with four ochreous-yellow curved bars." (*Mrs. S. Robson.*)

Race **sikhimica** (Pl. XIV, fig. 93, ♂), Heron.—A very slightly differentiated race. Can be distinguished by its generally larger size and more heavily defined black markings. On the upperside of the fore wing the fourth transverse black band from base crosses the cell and extends beyond the median vein, as in *P. glycerion.* In all specimens of *kashmirensis* that I have seen the above band stops short at the median vein; again, the postdiscal transverse black band extends in *sikhimica* to vein 1. The markings on the hind wings on both upper and under sides, except that they are broader, are as in *P. kashmirensis.*

Exp. ♂ ♀ 62–76 mm. (2·46–2·95″).

Hab. Sikhim; Assam.

According to Elwes this form in Sikhim inhabits a lower zone, 2000 to 4000 feet, than does *P. glycerion,* which extends up to 7000 feet.

ANTIPHATES GROUP.

♂ ♀. Characters similar to those of the *Glycerion* group, but in the fore wing the upper discocellular is only a little longer than the middle; the apex of the wing is on the whole more produced; the termen more oblique and slightly concave in the middle. "The light bands in the apical region with hair-like scales" (*Rothschild*).

As in the *Glycerion* group the males have a narrow abdominal fold on the hind wings, but are devoid of any scent-organ within it.

Key to the forms of the Antiphates *Group.*

a. Fore wing upperside: postdiscal and terminal black bands that coalesce below vein 3 and extend to tornus.	
a'. Hind wing upperside: basal three-fourths uniform white; black markings of underside show through by transparency	*P. antiphates*, p. 97.
b'. Hind wing upperside: basal three-fourths not uniform white, a subbasal transverse black streak and some upper discal black markings distinct	*P. antiphates*, race *epaminondas*, p. 98.
b. Fore wing upperside: postdiscal and terminal black bands that do not coalesce, but are distinct and do not extend to tornus	*P. antiphates*, race *alcibiades*, p. 99.

549. **Papilio antiphates**, *Cramer, Pap. Exot.* i, 1775, p. 113, pl. 72, figs. A, B; *Rothsch. Nov. Zool.* ii, 1895, p. 410.
Pathysa naira, *Moore, Lep. Ind.* vi, 1903, p. 22, pl. 475, figs. 1, 1 *a*, ♂.

Race epaminondas.

Papilio epaminondas, *Oberthür, Études d'Ent.* iv, 1879, p. 62, pl. 4, fig. 1; *Rothsch. Nov. Zool.* ii, 1895, p. 414; *Moore* (Pathysa), *Lep. Ind.* vi, 1903, p. 23, pl. 475, figs. 2, 2 *a*, 2 *b*, ♂ ♀.
Papilio laestrygonum, *Wood-Mason, Proc. A. S. B.* 1888, p. 102.

Race alcibiades (Pl. XIV, fig. 94).

Papilio alcibiades, *Fabr. Mant. Ins.* ii, 1787, p. 8; *Moore* (Pathysa) *Lep. Ind.* vi, 1903, p. 19, pl. 474, figs. 1, 1 *a*–1 *e*, larva & pupa, ♂ ♀.
Papilio antiphates, *Moore (nec Cramer), Cat. Lep. Mus. E. I. C.* i, 1857, p. 116, pl. 3, figs. 10, 10 *a*, larva & pupa; *id.* (*nec Cramer*) *Lep. Ceyl.* i, 1881, p. 142, pl. 63, figs. 1, 1 *a*, ♂; *Davidson & Aitken* (*nec Cramer*), *Journ. Bomb. N. H. Soc.* x, 1897, p. 579, pl. 6, figs. 1, 1 *a*, larva & pupa.
Papilio nebulosus, *Butler, A. M. N. H.* (5) vii, 1881, p. 33, pl. 4, fig. 3.
Papilio itamputi, *Butler in Forbes, Nat. Wand.* 1885, p. 276.
Papilio antiphates continentalis *et* P. antiphates ceylonicus, *Eimer, Artbild. Schmett.* 1889, pp. 137 & 149.
Papilio antiphates alcibiades, *Rothsch. Nov. Zool.* ii, 1895, p. 411.

♂ ♀. *Upperside* white. Fore wing: cell crossed by five short black bands, of which the basal extends to the dorsum, the subbasal into interspace 1, the medial and preapical up to the median vein, and the apical or fifth along the discocellulars; this last extends broadly on both sides of the veinlets and terminates at the lower apex of the cell; beyond these are broad postdiscal and terminal black transverse bands from costa to tornal angle; the two bands coalesce below vein 4 and terminate in a point at the tornus; the white portions of the cell anteriorly overlaid with pale green; short macular hyaline green bands between the black cellular apical band and the discal band and anteriorly between the latter and the terminal band. Hind wing: basal three-fourths uniform white, with black markings on the underside that show through by transparency; terminal fourth dark grey traversed by a curved irregular subterminal series of black lunules that ends in a black tornal spot and a terminal black

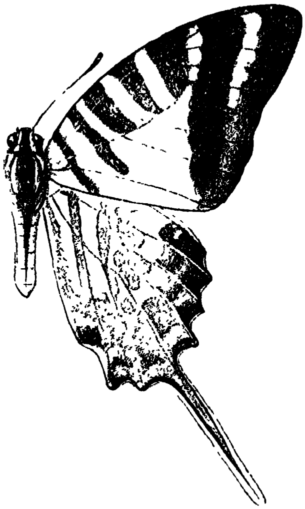
Fig. 20.—*Papilio antiphates.*

band that follows the indentations of the wing; the emargination below the black tornal spot edged with ochraceous; the tail blackish-grey, edged and tipped with white. *Underside*: fore wing similar with similar markings, but the green shading over the white portions in the basal half of the cell more decided; the discal and terminal transverse black bands separate, not joined posteriorly, the former edged posteriorly on both sides by dark grey due to the black on the upperside that shows through by transparency. Hind wing: basal half green, outer half white; a large black tornal spot; a black line along the dorsum that curves above the tornal spot outwards to vein 2; a straight subbasal black band from costa across cell that terminates on vein 2, where it joins the dorsal black line; a broader black band from costa across apex of cell extended into base of interspace 3; an irregular discal series of black markings curved inwards posteriorly towards the tornal spot; a subterminal series ot very small slender black lunules in pairs, the ground-colour on the inner side of these darkened to rich ochreous-yellow; lastly, a series of short terminal black bars in the interspaces so arranged as to follow indentations of the termen; tail dusky black edged with white. Antennæ black; head and thorax anteriorly with a broad black medial band, rest of thorax bluish; abdomen white, marked beneath on each side by a black stripe.

Exp. 90–104 mm. (3·55–4·1″).

Hab. Within our limits recorded only from Travancore.

This form was first described from China.

Race **epaminondas**, Oberthür. Differs from the typical form chiefly in the greater width of the black markings on the upperside, especially of the basal and subbasal bands that cross the fore wing, both of which also extend to the dorsum. On the hind wing the black markings of the underside on the basal and discal areas are not only seen by transparency from below, but are actually represented, though only partially, by black scaling; the width of the dark grey terminal portion is also greater, and it has a tendency to turn to dusky black anteriorly, so that the subterminal series of black lunules are obscured anteriorly and are difficult to make out. *Underside*: markings similar to those of the typical form, but broader; fore wing with the discal transverse band that reaches from costa to

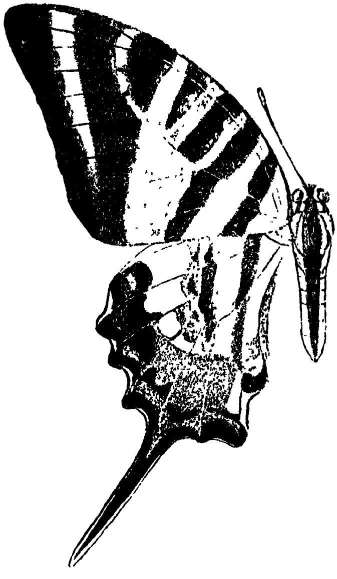

Fig. 21.—*Papilio antiphates*, race *epaminondas*.

vein 1; hind wing: the black bands that cross the cell broader and proportionately closer together.

Exp. ♂ ♀ 94–100 mm. (3·7–3·94″).

Hab. The Andamans.

Race **alcibiades**, Fabr.—This is the most widely spread race of *antiphates*, from which it differs as follows :—

♂ ♀. *Upperside*: all the black markings shorter and narrower. Fore wing: the discal and terminal bands separate, the former rarely extended below vein 3, the latter in no specimen reaches the dorsal margin. Hind wing: the broad grey area on the terminal margin reduced to a small patch of grey at the apices of interspaces 2 to 4; the subterminal black markings rarely present anteriorly, generally confined to the limits of the grey patch. *Underside*: the extent of the black markings similarly reduced, otherwise as in the typical form.

Exp. ♂ ♀ 82–94 mm. (3·24–3·7″).

Hab. Sikhim; Bhutan; Central and Western India; Ceylon; Assam; Burma; Tenasserim; extending to Siam, China, and far into the Malayan Subregion.

The width and length of the transverse black markings on the upperside of the fore wing, also the extent of the grey terminal area and the presence or absence of the black subterminal markings on the upperside of the hind wing, are all very variable.

Var. *nebulosus*, Butler, is a melanistic variety recorded from Sikhim.

Var. *continentalis*, Eimer, has the caudal area of the hind wing on the upperside suffused with black.

Var. *itamputi*, Butler, has the postdiscal and terminal black bands on the upperside of the fore wing united posteriorly, but neither band extends up to the tornus.

Var. *ceylonicus*, Eimer, has the basal two bands on the upperside of the fore wing extended beyond the median nervure, the preapical cellular band not triangular and extended to the median nervure.

The larva and pupa figured by Messrs. Davidson and Aitken (*l. c.*) were probably those of *P. antiphates*, race *alcibiades*.

Larva. "The most unusual feature of the larva is that in its early stages it is pure white marked only with thin transverse lines of black or dark green. At the last moult but one it becomes yellow with thicker lines, and after the last moult attains the colour shown in the figure, showing a distinct resemblance to the larva of *P. nomius*." (*Davidson & Aitken.*) The figure represents a white caterpillar about 1½ inch long, shaded with dusky green along the dorsum, the divisions of the segments marked with green and a prominent green lateral line. The head in the figure is apparently tucked in below, but the 2nd, 3rd and 4th segments have a patch of dark green above.

Pupa. "Supported by an uncommonly long band, and from its green colour would seem to be normally found on the plant (*Unona lawii*) and not under stones." (*Davidson & Aitken.*)

AGETES GROUP.

♂ ♀. Characters like those of the *Glycerion* group, the outline of the wings and venation similar, but the males have the abdominal fold in the hind wing well developed, with a well-marked cottony scent-organ within. The light-coloured portions of the fore wing anteriorly subhyaline, with hair-like, not normal, scales.

The typical form alone is found within our limits. In Borneo an allied form, *P. strateotes*, occurs along with a slightly differentiated race of the typical *agetes*.

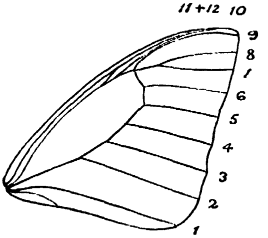

Fig. 22.—Venation of fore wing: *Papilio agetes*, Westw.

550. **Papilio agetes** (Pl. XIV, fig. 95), *Westwood, Arc. Ent.* ii, 1843, p. 23, pl. 55, figs. 1, 2; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 116; *Elwes, Trans. Ent. Soc.* 1888, p. 433; *Rothsch. Nov. Zool.* ii, 1895, p. 417; *Moore* (Deoris), *Lep. Ind.* vi, 1903, p. 31, pl. 478, figs. 2, 2*a*, 2*b*, ♂ ♀.

♂ ♀. *Upperside* white. Fore wing: cell crossed by three comparatively broad, oblique black bands, the innermost produced across interspaces 1 and 1*a* to the dorsal margin, the next to vein 1, sometimes a little beyond into interspace 1*a*, the third to the median vein; these are followed by a triangular costal black spot above the upper apex of the cell; a postdiscal oblique band similar to the others that extends from the costa to just above the tornus, where it joins a broad black terminal edging that lies between the apex of the wing and the tornus; the costal margin edged with a black thread which widens slightly beyond the postdiscal band. The white ground-colour in the anterior half of the cell, beyond the apex of the latter to the postdiscal black band, and in the area between the postdiscal and terminal bands, is hyaline with a greenish-yellow tinge. Hind wing: a spot at the tornal angle, the anal lobe, tail and terminal margin black; above the tornal spot is a short, comparatively broad, red band edged anteriorly by a fine black line that joins the spot to the black on the anal lobe; superposed on the black of the terminal margin there are some obscure white scalings; a triangular transverse subterminal white spot in interspace 3 and occasionally a subterminal short white line in interspace 4; also the anterior edge of the tail at base is touched with white. Seen by transparency from the underside are two convergent transverse black bands, the outer one of which is traversed by short transverse lines of red in interspaces 2, 6, 7 and 8. *Underside* similar; hind wing with the addition of the two black bands mentioned above, which coalesce above the tornal area. Antennæ, head, thorax and abdomen black, the head marked with red, the thorax on the sides with greyish pubescence; abdomen with lateral white stripes; beneath, white.

Exp. ♂ ♀ 71–84 mm. (2·80–3·30″).

Hab. Sikhim; Bhutan; Assam; Burma; Tenasserim; extending to the Malay Peninsula and Tonkin.

Aristeus Group.

♂ ♀. Characters similar to those of the *Glycerion* and *Antiphates* groups; neuration and shape of wings as in the latter, but the light-coloured bands in the apical region of the fore wing are normally scaled, and in the male the abdominal fold of the hind wing has a well-marked cottony scent-organ within.

Key to the forms of the Aristeus *Group.*

- *a.* Fore wing upperside: anterior four spots of subterminal series rounded, posterior spots elongate but not linear.
  - *a′.* Hind wing underside: no black interior edging to precostal spur .... *P. nomius*, p. 101.
  - *b′.* Hind wing underside: a conspicuous black interior edging to precostal spur .... *P. nomius*, race *swinhoei*, p. 103.
- *b.* Fore wing upperside: all spots of subterminal series linear.
  - *a′.* Fore wing upperside: a short black transverse band along discocellulars, not coalescent below apex of cell with postdiscal transverse band .... *P. aristeus*, race *anticrates*, p. 104.
  - *b′.* Fore wing upperside: short black transverse band along discocellulars, coalescent below apex of cell with postdiscal transverse band .... *P. aristeus*, race *hermocrates*, p. 104.

551. **Papilio nomius**, *Esper, Ausl. Schmett.* 1785–1798, pl. 52, fig. 3; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 115; *id.* (Pathysa) *Lep. Ceyl.* i, 1881, p. 142, pl. 62, fig. 2; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 364, pl. E, figs. 1, 1 *a*, larva & pupa; *Moore* (Pathysa), *Lep. Ind.* vi, 1903, p. 26, pl. 477, figs. 1, 1 *a*-1 *e*, larva & pupa, ♂ ♀; *Rothsch. Nov. Zool.* ii, 1895, p. 421.

Race swinhoei.

Papilio swinhoei, *Moore, P. Z. S.* 1878, p. 697.
Papilio nomius swinhoei, *Rothsch. Nov. Zool.* ii, 1895, p. 422.
Papilio nomius, *form temp.* pernomius, *Fruhstorfer, Berl. ent. Zeit.* xlvii, 1902, p. 202.
Pathysa pernomius, *Moore, Lep. Ind.* vi, 1903, p. 29, pl. 478, figs. 1, 1 *a*, 1 *b*, ♂.

♂ ♀. *Upperside* bluish-white. Fore wing: cell with five broad transverse black bands, the basal and subbasal bands produced to the dorsum, the medial band generally extended into interspace 2, the preapical ended on the median vein, and the fifth or apical from costa along the discocellulars extends on both sides of these and terminates at lower apex of cell; beyond the fifth band is a short macular transverse bar of the ground-colour that terminates on vein 5, followed by a very broad black terminal band that occupies about one-third of the width of the wing and is traversed by a transverse subterminal series of rounded spots of the ground-colour. Hind wing: ground-colour along dorsum and above vein 7 whitish; a streak along the dorsum, a subbasal and an inner discal transverse band from costa across cell, and a very broad terminal band, black; the former two joined near the tornus by cross lunular black marks, the terminal band traversed by a series of slender lunules of the ground-colour; a small black spot in interspace 1 above tornus and another at base of interspace 4; the black at the apices of interspaces 2 to 4 and the lunules of the ground-colour thereon suffused with grey; tail black, edged and tipped with white. *Underside* white, the black markings very similar but of a bronze-brown with the following exceptions:—Fore wing: extensions below the median vein of the basal, subbasal, and median transverse bands crossing the cell, and the inner portion below vein 4 of the terminal broad band, black: on the hind wing the inner discal band is broken, irregular and black, and is bordered by a series of red spots outwardly edged with black; the subterminal series of lunules of the ground-colour are broadly edged on the outer side with black; the grey patch in the caudal region is replaced by ochraceous grey. Antennæ black; head, thorax and abdomen creamy white, with a medial broad longitudinal stripe; beneath, the abdomen with lateral black stripes.

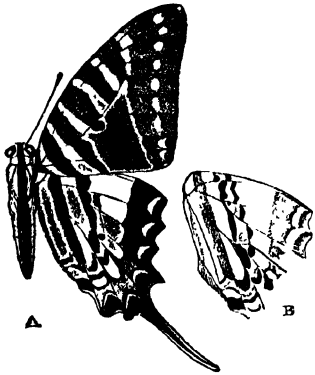

Fig. 23.
A. *Papilio nomius*, ⅔.
B. Underside: anterior portion of hind wing.

Exp. ♂ ♀ 68–95 mm. (2·68–3·75").

Hab. Sikhim; Central and Southern India; Ceylon.

I have, following Rothschild, kept this form as distinct from *P. aristeus*, Cramer, but in my opinion, like *anticrates*, Doubleday, and *hermocrates*, Felder, it is merely a geographical race of *aristeus*.

Larva. "Not so thick proportionally at the fourth segment as those of the last three (i. e. *agamemnon*, *sarpedon*, *doson*), and is somewhat quadrangular. It has four pairs of spines which are small but sharp. The most usual colour . . . . . . is black, banded on the sides with narrow white stripes, except on the first three or four segments and the last, on which there is more or less rusty red; but the shade varies very much, and in some the ground-colour is green." (*Davidson & Aitken.*)

Pupa. "Has the usual horn which characterizes this group, and also two short processes on the head, and is of some shade of earthy-brown. It is attached by the tail and a close band in crevices or under stones or roots." (*Davidson & Aitken.*)

Race **swinhoei**, Moore.—Differs from typical *nomius* as follows:— ♂ ♀. *Upperside*: all the black markings distinctly broader. Fore wing: the transverse band that crosses the cell before apex generally extends beyond the median vein; hind wing: the terminal black band much broader, extended inwardly right up to and coalesced with the black lunules that connect the subbasal and discal transverse bands; the grey subcaudal patch absent or obsolescent. *Underside*: similar to that of *nomius*. On the fore wing the extension below the median vein of the transverse band that crosses the cell preapically, brown not black; on the hind wing the precostal spur edged narrowly on the inner side by black; the red macular discal band broader and the black edging to the subterminal series of lunules better defined.

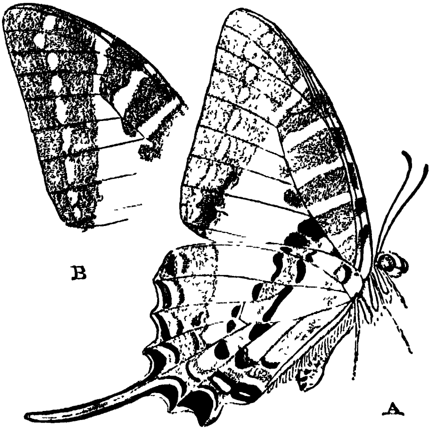

Fig. 24.—A. *Papilio nomius*, race *swinhoei*: underside.
B. „ „ „ „ apical half, upperside of fore wing.

Exp. ♂ ♀ 74-86 mm. (2·92-3·38").

Hab. Recorded from Sikhim?; Burma; Tenasserim.

Described originally from Hainan, and later by Fruhstorfer under the name *pernomius* from Siam.

552. **Papilio aristeus,** *Cramer, Pap. Exot.* iv, 1782, p. 60, pl. 318, figs. E, F.

Race hermocrates.

Papilio hermocrates, *Felder, Verh. z.-b. Ges. Wien*, xiv, 1864, p. 302: *id. Reise Nov., Lep.* i, p. 57, pl. 12, figs. E, F; *Elwes & de N. J. A. S. B.* 1886, p. 437.
Papilio aristeus hermocrates, *Rothschild, Nov. Zool.* ii, 1895, p. 420.

Race anticrates.

Papilio anticrates, *Doubleday, A. M. N. H.* xviii, 1846, p. 371; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 115; *Elwes. Trans. Ent. Soc.* 1888, p. 434; *Moore* (Pathysa), *Lep. Ind.* vi, 1903, p. 24, pl. 476, figs. 1, 1 *a*–1 *c*, ♂ ♀.
Papilio aristeus anticrates, *Rothsch. Nov. Zool.* ii, 1895, p. 419.

Race **hermocrates,** Felder.—Very closely resembles *P. nomius*, from which it differs as follows:—♂ ♀. *Upperside*: the black markings very much broader, slightly broader even than in *swinhoei*, the eastern form of *P. nomius*. Fore wing: the transverse short black band that crosses the cell before the apex (*i. e.* 4th band) narrowed posteriorly and terminated as in *nomius* on the median vein; the black terminal band very broad, covers more than the outer third of the wing, coalesces with the black band on the discocellulars, and encloses the short macular bar of ground-colour beyond the cell; the subterminal band of spots of the ground-colour that traverse the black margin linear, not rounded. Hind wing similar to the hind wing in *nomius* race *swinhoei*, but the grey subcaudal patch as in typical *nomius*. *Underside*: similar to the underside in *nomius*, with the differences in the width of the markings as seen on the upperside, and in the shape of the subterminal line of spots on the fore wing; the precostal spur is as in *nomius* and not as in *swinhoei*.

Exp. ♂ ♀ 74–84 mm. (2·93–3·28″).

Hab. Within our limits recorded from Burma and Southern Tenasserim. Described originally from the Philippines; occurs throughout the Malayan Subregion.

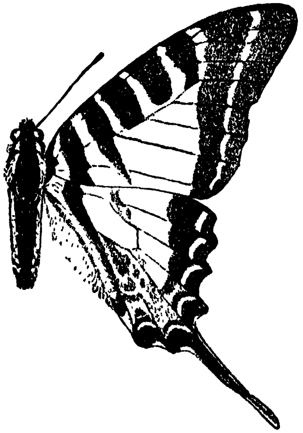

Fig. 25.—*Papilio aristeus*, race *anticrates*.

Race **anticrates,** Doubleday.—♂ ♀. This race of *aristeus* more closely resembles *nomius* than does *hermocrates*. From *nomius*, however, it can be distinguished as follows:—*Upperside*: ground-colour whiter with the very faintest tinge of green in fresh specimens. Fore wing: subbasal transverse black band somewhat attenuate posteriorly; in the cell the preapical band subtriangular, sometimes not extended to the median vein; the terminal series of spots of the ground-colour linear as in *hermocrates*, posteriorly these become lunular in shape. Hind wing: the discal black band obsolescent, only faintly defined near costa and at posterior end; terminal black band and terminal lunules of the ground-colour as in *nomius* but narrow; grey subcaudal patch as in *nomius*. *Underside*: similar to the underside in *nomius* with the following exceptions—the black markings of the upperside entirely replaced by a bronze-brown; the discal series of red spots are edged with black, and the outer edgings to the subterminal series of white lunules are prominently and broadly black.

Exp. ♂ ♀ 77–84 (3·03–3·28″).

Hab. Sikhim; Bhutan; Assam.

EURYPYLUS-AGAMEMNON GROUP.

♂ ♀. Venation similar to that of the *Glycerion* group. Fore wing: costa widely arched, apex produced, obtuse; termen straight or at the most slightly concave and sinuous; tornus rounded; dorsum very short, not nearly one-half the length of the costa, thus the wing forms a high and narrow triangle if the dorsum is taken as the base. Hind wing: costa long, slightly arched; termen slightly scalloped, generally, but not in all the forms, tailed at apex of vein 4; tail when present narrow, short, scarcely spatulate, usually with a very slight upward curve; dorsum straight; abdominal fold in the ♂ rather broad, with a well-marked elongate tuft of scent-hairs. Antennæ about half length of fore wing, club well-marked.

Key to the forms of the Eurypylus-Agamemnon *Group*.

A. Fore wing upperside: ground-colour black, cell with markings of green or bluish-green.
  a. Fore wing upperside: cell with these markings all single.
    a′. Hind wing underside: with more or less conspicuous crimson spots.
      a^2. Fore wing upperside: discal band of spots narrow; hind wing underside: crimson spots somewhat obsolescent, not well-defined .... *P. eurypylus*, race *jason*, p. 106.
      b^2. Fore wing upperside: discal band of spots broad; hind wing underside: crimson spots very prominent, well-defined .... *P. eurypylus*, race *axion*, p. 107.
    b′. Hind wing underside: with conspicuous ochreous-yellow spots .... *P. bathycles*, race *chiron*, p. 108.

b. Fore wing upperside: cell with the medial markings double, formed into paired spots.

a'. Hind wing underside: without crimson red spots in interspaces 2, 3 and 4 .... *P. agamemnon*, p. 110.

b'. Hind wing underside: with more or less prominent crimson-red spots in interspaces 2, 3 and 4 .... *P. agamemnon*, race *decoratus*, p. 108.

c. Fore wing upperside: cell with a long and broad subhyaline bluish streak in its lower half and a large quadrate spot beyond at apex .... *P. cloanthus*, p. 110.

B. Fore wing upperside: ground-colour black, cell without any markings.

a. Upperside: medial bluish band on both fore and hind wing broad, anterior spots that compose it only slightly greenish ...... *P. sarpedon*, p. 111.

b. Upperside; medial bluish band on both fore and hind wing comparatively narrow, anterior spots that compose it on fore wing strongly tinged with green, in marked contrast to posterior two spots .. *P. sarpedon*, race *teredon*, p. 112.

553. **Papilio eurypylus**, *Linn. Syst. Nat.* ed. x, 1758, p. 464.

Race jason (Pl. XIV, fig. 96).

?Papilio jason, *Linn. Syst. Nat.* ed. x, 1758, p. 485.

Papilio jason, *Esper, Ausl. Schmett.* 1796–1798, pl. 58, fig. 5; *Moore* (Zetides), *Lep. Ind.* vi, 1903, p. 1, pl. 467, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Papilio telephus, *Felder, Verh. zool.-bot. Ges. Wien*, xiv, 1864, p. 305; *Moore* (Zetides), *Lep. Ceyl.* i, 1881, p. 144, pl. 63, fig. 3.

Papilio doson, *Felder, Verh. zool.-bot. Ges. Wien*, xiv, 1864, p. 305; *Moore* (Zetides), *Lep. Ceyl.* i, 1881, p. 145, pl. 61, fig. 3; *Davidson & Aitken, Journ. Bomb. N. H. Soc.* v, 1890, p. 364, pl. E, figs. 2, 2*a*, larva & pupa.

Papilio eurypylus jason, *Rothsch. Nov. Zool.* ii, 1895, p. 432.

Race axion.

Papilio axion, *Felder, Verh. zool.-bot. Ges. Wien*, xiv, 1864, pp. 305 & 350; *Moore* (Zetides), *Lep. Ind.* vi, 1903, p. 4, pl. 468, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Papilio acheron, *Moore, A. M. N. H.* (5) xvi, 1885, p. 120.

Papilio eurypylus axion, *Rothsch. Nov. Zool.* ii, 1895, p. 433.

Race **jason**, Linn.—♂ ♀. *Upperside* black. Fore wing: three slender, oblique, short pale green streaks in basal half of cell and two irregular small similarly-coloured spots near its apex; a discal band composed of pale green spots that gradually diminish in size anteriorly, the spot in interspace 5 the smallest, the two in the interspaces above it slightly larger; a spot at base of interspace 7 and a sinuous complete subterminal series of spots similarly coloured. Hind wing: a transverse band that extends as far as interspace 2 posteriorly and is a continuation of the discal band on the fore wing;

the upper portion of this band white, the lower pale green; this is followed by a sinuous subterminal series of small pale green spots as on the fore wing. *Underside*: brownish-fulvous black; markings similar, larger, their edges diffuse and all of a silvery white, slightly tinted with pale green. Hind wing in addition has a white basal streak that extends halfway down the dorsal margin; another shorter white subbasal streak from costa to the subcostal vein coalescent with the white of the discal band in the cell, the streak of ground-colour that lies between this subbasal and the discal band jet-black, interrupted where it crosses vein 8 by a crimson spot; finally, quadrate black spots near apex of cell and at bases of interspaces 1, 2 and 3, all outwardly margined with crimson. Antennæ, head, thorax and abdomen black; beneath: the palpi, thorax and abdomen touched with white, the abdomen with dingy white lateral lines.—♂. Abdominal fold within grey, with a fringe of white hairs.

Exp. ♂ ♀ 76–90 mm. (3·02–3·56″).

Hab. Southern India; Ceylon.

Larva. "Very like that of *P. agamemnon*, but the second pair of spines is entirely wanting and the third pair, which in *agamemnon* is rather long, curved and sharp, is reduced in this species to mere knobs encircled with a black ring. The colour is generally black or smoky until the last moult and then dull green, inclining to rusty brown on the sides, but some of our specimens remained quite black to the end." (*Davidson & Aitken.*)

Pupa. "The distinguishing mark of the pupa is again in the frontal horn, which is straight as in *agamemnon*, but directed forward instead of being almost erect. Its colour is normally green, but varies with that of the object to which it is attached." (*Davidson & Aitken.*)

Race **axion**, Felder.—♂ ♀. Can be distinguished from *P. eurypylus* race *jason* as follows:—The markings that compose the discal band very much broader; all the spots and markings of pale green and white conspicuously larger, especially in the spring broods (*acheron*, Moore). Underside of hind wing: crimson spots more conspicuous, a line of crimson along the posterior portion of the dorsal margin; in most specimens the short subbasal narrow band of white that runs from the costa to the subcostal vein does not coalesce with the white of the discal band where it crosses the cell.

Exp. ♂ ♀ 78–102 mm. (3·10–4″).

Hab. The Himalayas under 5000 ft. from Kumaon to Sikhim and Bhutan; Eastern Bengal; Assam; Burma; Tenasserim; the Andamans; extending southwards into the Malayan Subregion as far as Borneo and Java, and eastwards to Siam and China.

Larva and *pupa*. Very similar to those of the race *jason*, but the former, as figured by Moore, has a red lateral spot on the 3rd segment.

554. **Papilio bathycles,** *Zinken-Sommer, Nov. Act. Ac. Nat. Cur.* 1831, p. 157, pl. 14, figs. 6, 7, ♂.

Race chiron.

Papilio bathycles, *Dbldy., Westw. & Hew.* (*nec Zink.-Som.*) *Gen Di. Lep.* i, 1846, p. 14 ; *Moore* (*nec Zink.-Som.*), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 114 ; *Manders* (*nec Zink.-Som.*), *Trans. Ent. Soc.* 1890, p. 536.

Papilio chiron, *Wallace, Trans. Linn. Soc.* xxv, 1865, p. 66, note ; *Moore* (Zetides), *Lep. Ind.* vi, 1903, p. 6, pl. 469, figs. 1, 1 *a*, 1 *c*, ♂ ♀.

Papilio bathycles chiron, *Rothsch. Nov. Zool.* ii, 1895, p. 438.

Race **chiron,** Wall.—♂ ♀. Closely resembles in colour and in the disposition of the markings *P. eurypylus,* races *jason* and *axion*, more especially the latter, but on the upperside the anterior markings are all strongly tinged with yellow and the spots or patches that compose the discal band on both fore and hind wing are well-separated one from the other; on the hind wing, moreover, the apical spot of the subterminal series is invariably white, not pale green like the other spots of the series, and is very often elongate and diffuse. *Underside*: fore wing very similar to that of *axion*. Hind wing: with the following silvery white markings:—a moderately broad basal band reaches from costa across the wing and along the dorsum to the tornal angle, broad elongate streaks in the cell and in interspaces 2 and 3, a small spot at base of interspace 4, an inwardly conical larger elongate spot at base of 6, a very large quadrate spot in 7, and an elongate spot like that in 6 in interspace 8 but outwardly not inwardly conical, interior to the two latter spots are two broad lunular spots in interspaces 7 and 8; all the anteriorly basal markings are strongly tinged with silky yellow; on the outer half of the wing there is a postdiscal series of orange-yellow and a subterminal complete series of silvery white spots, the upper two of which have further short narrow similarly-coloured streaks below them in the interspaces. Antennæ, head and thorax black, the thorax with dark greyish pubescence, abdomen brownish-black; beneath and the abdomen laterally marked and streaked with white.

Exp. ♂ ♀ 86–100 mm. (3·40–3·94″).

Hab. Sikhim; Assam; Burma: the Shan States; extending to Siam, Annam and W. China.

555. **Papilio agamemnon,** *Linn. Syst. Nat.* ed. x, 1758, p. 462; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 114, pl. 3, figs 9, 9 *a*, larva & pupa; *Moore* (Zetides), *Lep. Ceyl.* i, 1881, p. 145, pl. 63, figs. 2, 2 *a*, ♂, larva; *Davidson & Aitken, Journ. Bomb. N. H. Soc.* v, 1890, p. 363; *Rothsch. Nov. Zool.* ii, 1895, p. 447; *Moore* (Zetides), *Lep. Ind.* vi, 1903, p. 7, pl. 470, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Race decoratus.

Papilio agamemnon decoratus, *Rothsch. Nov. Zool.* ii, 1895, p. 452.

♂. *Upperside*: black. Fore wing with the following green markings:—a spot at the extreme base of the costal margin, a transverse short bar near base of cell and seven spots beyond, two and two except the apical spot which is single; two spots beyond apex of cell; a spot at base of interspaces 1 *a* and 1, followed by two oblique short macular bands; a discal series of spots decreasing in size towards the costa, and a postdiscal series of smaller spots that begins with two in interspace 1; the spots in interspace 7 in both series are out of line, placed outwards. Hind wing: three series of similarly-coloured markings that run transversely across the wing more or less parallel to the dorsal margin, the upper markings (*i. e.* those in interspace 7) white; a short greenish stripe at the extreme base of the wing. *Underside*: fuliginous brown or brownish-black, more or less suffused with pink along the costal margin, on apical area and along the outer margin of the discal markings on the fore wing, broadly along the dorsal and terminal margins and at base of interspaces 6 and 7 on the hind wing; markings similar to those on the upperside but less clearly defined and somewhat more grey in tint. Hind wing black, inwardly red-margined spots superposed on the pink area in interspaces 6 and 7. Cilia very narrow, pale pink. Antennæ, head, thorax and abdomen black, thorax above and the abdomen on the sides streaked with greenish grey; beneath: ochreous grey touched on the thorax with pink.—♀ similar, but with a streak of greenish white along the dorsal margin on both upper and under sides.

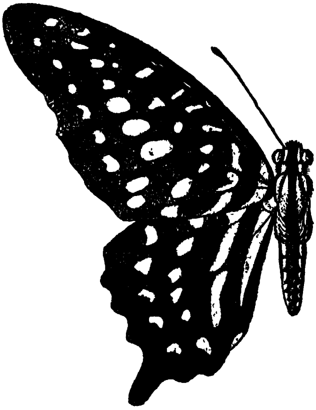

Fig. 26.—*Papilio agamemnon.*

Exp. ♂ ♀ 90–102 mm. (3·56–4·04").

Hab. More or less throughout our limits except in the desert tracts and regions of scanty rainfall; extending to China and through the Malayan Subregion to the Philippines.

The ground-colour of the underside is somewhat variable, this in some specimens is much paler than in others and varies also in the amount and the tint of pink suffusion. Burmese specimens generally have indications of a more or less complete curved series of red spots on the underside of the hind wing in continuation of the red spots at base of interspaces 6 and 7; in this they approximate to the Andaman and Nicobar race.

Larva. "From the head, which is moderately large, the body increases in thickness rapidly to the 4th or 5th segment and then tapers gradually down to the tail. It has four pairs of spines. The colour is at first smoky-black, but at the last moult becomes a light clear green faintly marked with lines of a darker shade." (*Davidson & Aitken.*)

Pupa. "Normally of a pale watery green, the horns being broadly tipped with rusty brown which continues in an irregular line along the outside edge of the wing-cases." (*Davidson & Aitken.*)

Race **decoratus**, Rothschild.—Very similar to the typical form, from which it can be distinguished as follows:—♂ ♀. *Upperside*: green spots smaller, especially the discal series on the fore wing. *Underside* hind wing: "the red postcostal spot is relatively small but the red part has much increased against the black part; besides the large red anal mark and the mark before the first discocellular veinlet, there is a large red spot in the lower median cellule [interspace 2], a smaller red spot in each of the three preceding cellules [interspaces 3, 4, 5] and a streak-like spot at the base of the lower median cellule." (*Rothschild.*)

Exp. ♂ ♀ 84–98 mm. (3·32–3·86").

Hab. Andamans; Nicobars.

556. **Papilo cloanthus** (Pl. XIV, fig. 97), *Westwood, Arcana Ent.* i, 1841, p. 42, pl. 11, fig. 2; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 112; *Rothsch. Nov. Zool.* ii, 1895, p. 445; *Robson, Journ. Bomb. N. H. Soc.* ix, 1895, p. 497, larva; *Mackinnon & de N. Journ. Bomb. N. H. Soc.* xi, 1898, p. 595, pl. W, figs. 27 *a* 27 *c*, larva & pupa; *Moore* (Dalchina), *Lep. Ind.* vi, 1903, p. 16, pl. 473, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

♂ ♀. *Upperside*, fore wing: costal margin up to a line through the anterior half of the cell to the apex of the wing and the terminal margin broadly black; the medial portion of the wing pale hyaline greenish-yellow interrupted anteriorly by the following irregular black bands that join the black on the costa to the black on the termen:—a band across middle of cell and along vein 4, another at apex of cell and along vein 5, and two shorter and more oblique nearer the apex of the wing; the hyaline spot left close to the apex much smaller than those below; lastly, a pale subterminal, somewhat obscure broad line. Hind wing: an even black band along the dorsum in continuation of the black on the costal margin of the fore wing, joined below to a very broad black band on the terminal margin; the remaining triangular medial portion of the wing and a transverse subterminal series of large spots hyaline greenish-yellow; the dorsal margin of the wing with long soft pale hairs and touches of grey scaling on the tornal area. *Underside*: similar, with on the hind wing a series of slender crimson markings at extreme base of wing along vein 1, broadened at the tornal angle and in interspaces 2 to 5; lastly, admarginal white slender lines at the tornal angle and in interspaces 2 and 3. Antennæ, head, thorax and abdomen dark brownish black, the thorax with lateral dark grey pubescence; beneath: the palpi, thorax and abdomen touched with dingy white, the abdomen with three lateral whitish stripes.—♂. Abdominal fold within grey, studded with a brush of long white hairs as in *sarpedon*.

Exp. ♂ ♀ 79–102 mm. (3·12–4·04").

Hab. The Himalayas at no great elevations from Kashmir to Sikhim and Bhutan; Assam; Burma: the Shan States.

Larva. "Widest at the 5th segment, from which it tapers gradually to the 13th segment. The ridge over the head is furnished with two tubercles, black in front, white posteriorly. The 5th segment has a yellow bar which projects on each side beyond the body and has the appearances of a yoke. The points of the yoke are black. Colour green. The 13th segment is of a pale transparent blue-green. A pale yellow subdorsal line and an almost white spiracular line are the only markings. Head of a greenish-yellow. Legs, claspers and abdomen of the same colour as the 13th segment. The 13th segment ends in two sharp points which join at the end, so that the division between them is visible only on a close examination." (*Robson.*)

557. **Papilio sarpedon,** *Linn. Syst. Nat.* ed. x, 1758, p. 461; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 113, pl. 3, fig. 8, larva; *Rothsch. Nov. Zool.* ii, 1895, p. 440; *Moore* (Dalchina) *Lep. Ind.* vi, 1903, p. 12, pl. 471, figs. 1, 1 *a*–1 *c*, larva & pupa, ♂ ♀.

Race teredon (Pl. XV, fig. 98).

Papilio teredon, *Felder, Verh. zool.-bot. Ges. Wien,* xiv, 1864, p. 305; *Moore* (Dalchina), *Lep. Ceyl.* i, 1881, p. 143, pl. 62, figs. 1, 1 *a*–1 *b*, ♂ ♀, larva & pupa; *id.* (Dalchina) *Lep. Ind.* vi, 1903, p. 14, pl. 472, figs. 1, 1*a*-1*c*, larva & pupa, ♂ ♀.

Papilo sarpedon, *Davidson & Aitken* (*nec Linn.*), *Journ. Bomb. N. H. Soc.* v, 1890, p. 364.

Papilio sarpedon teredon, *Rothsch. Nov. Zool.* ii, 1895, p. 442.

♂ ♀. *Upperside* opaque black. Fore and hind wings crossed from above the tornal area on the hind to near the apex of the fore wing by a semi-hyaline broad pale blue medial band which is broadest in the middle, more or less greenish and macular anteriorly; the portion of the band that crosses interspaces 6, 7 and 8 on the hind wing white; beyond the band on the hind wing there is a subterminal line of blue slender lunules. *Underside* similar, ground-colour dark brown. Hind wing: a short comparatively broad subbasal band from costa to subcostal vein, and the postdiscal area between the medial blue band and the subterminal lunules velvety black traversed by the pale veins and transversely, except in interspaces 6 and 7, by narrow crimson lines; lastly, a crimson spot near the tornal angle with an admarginal yellowish-white spot below it. Antennæ,

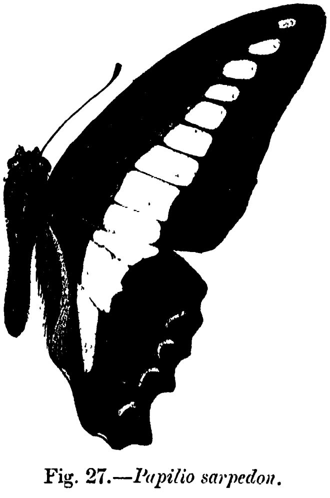

Fig. 27.—*Papilio sarpedon.*

head, thorax and abdomen brown, the head and thorax suffused with greenish grey; beneath: the palpi, thorax and abdomen touched with dingy white, the abdomen with two whitish lateral lines.—♂. Abdominal fold within grey, furnished with a tuft of long, somewhat stiff white hairs.

Exp. ♂ ♀ 81–95 mm. (3·20–3·76″).

Hab. The Himalayas at comparatively low elevations; South-Western India; Assam; Burma; Tenasserim; extending to the Malayan Subregion, China and Japan.

Larva. "Smooth, thickened from the second to the 5th segment and thence decreasing to the end; with two short subdorsal fleshy spines on the 4th segment, between which is a transverse pale yellow line, two shorter spines also on the 2nd and 3rd and two on the anal segment; colour green, with a longitudinal posterior lateral and lower pale yellowish line." (*Moore.*)

Pupa. "Conical, truncated in front; thorax produced into a lengthened obtusely-pointed frontal process." (*Moore.*)

Race **teredon**, Felder.—A slightly differentiated race, distinguishable in both sexes by the narrower medial band that crosses both fore and hind wing. Colour brighter, the contrast between the green of the upper and the blue of the lower portion of the medial band more vivid. Hind wing more produced posteriorly at apex of vein 3, where it forms an elongate tooth or short tail.

Exp. ♂ ♀ 74–90 mm. (2·92–3·56″).

Hab. Southern India; Ceylon.

Larva. "Very like that of *agamemnon* but prettier, being of a soft dark green, inclining to emerald and passing into a pale bluish on the last segment and the underparts." (*Davidson & Aitken.*)

Pupa. "Easily distinguished from that of *agamemnon* by one mark, viz. the horn is not straight but curves slightly backwards." (*Davidson & Aitken.*)

Macareus Group.

♂ ♀. The forms of this group bear a sufficiently close resemblance to the bluish-white striped Danaids, that are protected by a disagreeable odour and taste, to be themselves to a certain extent protected from the attacks of insectivorous birds. The neuration of the fore wing is more or less like that in the *Glycerion*, *Antiphates* and other groups. Vein 11 anastomosed with vein 12, but the hind wing is not tailed in any member of this group, though the abdominal fold in the hind wing of the male is always present.

Key to the forms of the Macareus *Group.*

a. Hind wing underside: ground-colour along a broad terminal band much darker than and contrasting with ground-colour on basal and discal areas of wing.
  a′. Upperside bluish grey; stripes very broad, filling cell and interspaces; tornal yellow spot on hind wing very large .... *P. xenocles*, p. 113.

b'. Upperside bluish grey, stripes narrow; tornal yellow spot on hind wing absent or if present very small .... *P. macareus*, race *indicus*, p. 114.

b. Hind wing underside: ground-colour over entire wing of uniform tint .... *P. megarus*, p. 115.

558. **Papilio xenocles**, *Doubleday in Gray's Zool. Misc.* 1842, p. 74; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 90; *Rothschild, Nov. Zool.* ii, p. 458; *Moore* (Paranticopsis), *Lep. Ind.* vi, 1904, p. 113, pl. 516, figs. 2, 2 *a*, ♂ ♀.

Papilio (Paranticopsis) phrontis, *de Nicéville, J. A. S. B.* lxvi, 1897, p. 568, ♂ ♀; *Moore* (Paranticopsis), *Lep. Ind.* vi, 1904, p. 112, pl. 516, figs. 1, 1 *a*, ♂ ♀.

Papilio xenocles, *form temp.* neronus, *Fruhstorfer, Soc. Ent.* 1902, p. 74.

Pararanticopsis neronus, *Moore, Lep. Ind.* vi, 1904, p. 114, pl. 517, figs. 1, 1 *a*, ♂.

♂. *Upperside*: black. Fore wing with the following greenish or bluish-white streaks and spots:—cell with three transverse, very oblique, broad streaks and two elongate spots near apex; in the type as described the outer two of the three streaks coalescent; broad streaks from base in interspaces 1*a* to 3; a series of four rounded spots beyond apex of cell in interspaces 4, 5, 6 and 8, followed by five short streaks that are outwardly truncate or emarginate, in interspaces 4 to 8; lastly, a complete subterminal series of comparatively large rounded spots. Hind wing with similar greenish- or bluish-white streaks and spots as follows:—a broad curved streak in cell; broad streaks from base in interspaces 1 to 7, these streaks vary in length but invariably leave a comparatively broad margin of the ground-colour beyond; the streak in interspace 7 white, that in interspace 1, and in some specimens in interspace 2 also, with a large yellow spot beyond the apex; lastly, a subterminal series of spots some or all of which may be absent, but when present the posterior three always somewhat lunular. *Underside*: fuliginous brown, paler towards the apical area of fore wing; markings as on the upperside, but duller and less clearly defined. Antennæ, head, thorax and abdomen black; two spots on the head, the thorax and abdomen laterally, white; beneath: the thorax and abdomen white, the latter with a medial and a lateral narrow stripe.—♀. Similar to the ♂ with similar markings; those on the

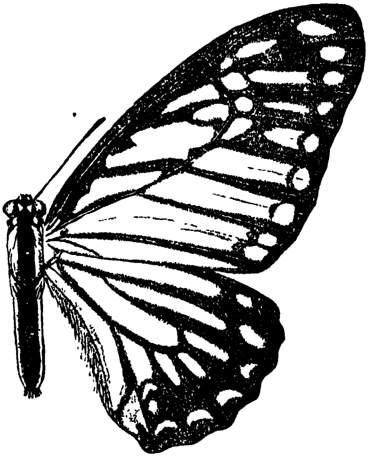

Fig. 28.—*Papilio xenocles.*

hind wing in the few females I have seen vary in width more than they do in the males; the ground-colour also of the hind wing is generally of a chestnut-red, not black or fuliginous.

Exp. ♂ ♀ 92–124 mm. (3·64–4·9″).

Hab. Sikhim; Bhutan; the hills of Assam, Burma, and Tenasserim; extending through the Shan States to Siam.

The type was from Assam. De Nicéville separated the Sikhim form under the name *phrontis*, and Fruhstorfer the Eastern Burmese and Siam form as *neronus*; but the distinguishing characters, viz., in *phrontis*, the shade of the ground-colour and size and extent of the bluish-white markings in the ♀ only, and in *neronus*, the absence of the subterminal series of spots on the hind wing, seem to me eminently variable in specimens from all parts of the insect's range.

559. **Papilio macareus**, *Godart, Enc. Méth.* ix, 1819, p. 76.

Race indicus.

Papilio macareus indicus, *Rothsch. Nov. Zool.* ii, 1895, p. 457.
Papilio (Paranticopsis) polynices, *de Nicéville, J. A. S. B.* lxvi, 1897, p. 568.
Paranticopsis polynices, *Moore, Lep. Ind.* vi, 1904, p. 109, pl. 515, figs. 1, 1 *a*, ♂ ♀.
Paranticopsis indicus, *Moore, Lep. Ind.* vi, 1904, p. 110, pl. 515, figs. 2, 2 *a*, 2 *b*, ♂ ♀.

Race **indicus**, Rothsch.—♂. *Upperside*: ground-colour and markings very similar to those of *P. xenocles*, but the former is of a more brownish-fuliginous tint and the latter are all very much narrower; also there are distinctly two well-divided streaks in interspace 1 of the fore wing; on the hind wing there is never any tornal yellow spot, while the bluish-white streak in the cell is very often divided. *Underside*: similar to the upperside both in ground-colour and markings, only the latter are much broader than on the upperside. It differs from the underside of *P. xenocles* by the absence in most specimens of the yellow tornal spot on the hind wing; also the terminal brown margin on the same wing is proportionately much broader and much darker. Antennæ, head, thorax and abdomen coloured as in *P. xenocles*.—♀. Dimorphic or trimorphic. First form similar to ♂, with similar but proportionately broader markings (typical *polynices*). Second form similar to ♂ with similar markings, but on the fore wing the inner portion of the

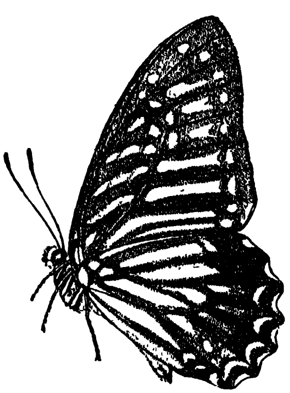

Fig. 29.—*Papilio macareus*, race *indicus*.

cell-streaks and the upper of the two spots at apex of cell, also the upper and lower of the four spots beyond the cell, obsolete or very faintly indicated; on the hind wing the streaks are very much narrower and there is a very small ochraceous-yellow tornal spot. Third form (*indicus* ♀, Rothschild): "Fore wings devoid of all markings except the submarginal ones; the hind wings provided with all the markings of the ♂, though these markings are shorter and less well-defined than in that sex." (*Rothschild.*)

Exp. ♂ ♀ 83–101 mm. (3·26–4").

Hab. Sikhim; Assam; Burma; Tenasserim; extending through the Shan States to Siam.

Polynices, de Nicéville, was separated from *P. macareus indicus*, Rothschild, on one sex (♀) only. The females of *P. macareus* race *indicus* seem to be exceedingly rare, and it seems to me probable that *polynices*, de Nicéville, will prove to be the normal form of the ♀, while the other two described above will turn out to be aberrations.

560. **Papilio megarus**, *Westwood, Arc. Ent.* ii, 1845, p. 98, pl. 72, fig. 2; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 90; *Elwes, Trans. Ent. Soc.* 1888, p. 430; *Rothsch. Nov. Zool.* ii, 1895, p. 460; *Moore* (Paranticopsis), *Lep. Ind.* vi, 1904, p. 114, pl. 517, figs. 2, 2 *a*, ♂ ♀.

♂. *Upperside*: black with the following white streaks and spots—Fore wing: cell with a small spot at base followed by three obliquely transverse streaks in middle, none extended to either the subcostal or median veins, and two spots near apex; single slender narrow streaks in interspaces 1 *a* and 2, and two streaks in interspace 1; above these a spot at base followed by a streak in each of the interspaces 3, 4, 6 and 8, an outer spot only in interspace 5, and a basal spot in interspace 7; finally, a complete series of small subterminal spots. Hind wing: a streak in cell with a spot above its outer apex; a streak followed by a spot in each of the interspaces 1, 6 and 7; three elongate spots in interspaces 2 and 3 and two in interspaces 4 and 5; finally, a series of four slender subterminal lunules in interspaces 2 to 5. *Underside* similar, with similar but slightly broader markings.—♀. Similar, ground-colour duller, more fuliginous black; markings similar, on the fore wing slightly broader, on the hind wing slightly narrower, than in the ♂.

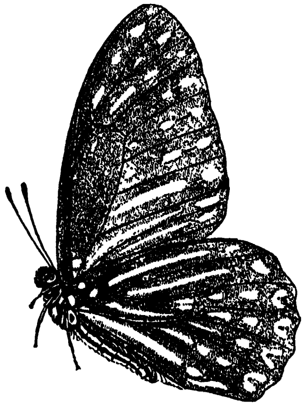
Fig. 30.—*Papilio megarus.*

Exp. ♂ ♀ 58–88 mm. (2·28–3·5").

Hab. Sikhim; Bhutan; the hills of Assam, Burma and Tenasserim; extending through the Shan States to Siam.

The markings are variable in size, and in the ♂ are in many specimens almost completely absent from, or barely indicated in, the cell of the fore wing.

Genus PARNASSIUS.

Parnassius, *Latr. Hist. Nat. Crust. et Ins.* xiv, 1805, p. 110.
Doritis, pt., *Fabr. in Illiger's Mag.* vi, 1807, p. 283.
Tadumia, Kailasius, Koramius, *Moore, Lep. Ind.* v, 1901-1903, pp. 116, 118, & 120.

Type, *P. apollo*, Linn., European.

Range. Europe, Asia, and North America at high elevations.

♂ ♀. Wings broad, semidiaphanous; character of markings very similar throughout the forms. Fore wing: costa very slightly arched, apex broadly rounded; termen very convex; dorsum straight; cell generally about half length of wing or a little shorter; upper discocellular short or obsolete, middle concave, more than twice length of lower, lower sloped obliquely inwards; veins 6 and 7 from apex of cell or very close together at base, 8 wanting, 9 out of 7 closer to apex of cell than to apex of wing; 10 from just before or from apex, or out of 7 from just beyond apex of cell, typically free, but in some forms anastomosed with 11; 11 from apical half of subcostal vein. Hind wing: more or less irregularly pear-shaped; costal and terminal margins in a continuous curve, apex therefore not well marked; tornus prominent, obtusely angular; dorsum concave or slightly excavate. Body very hairy; antennæ short, robust, about a third of the length of the fore wing; club stout, gradual; palpi short, oblique, not adpressed as in *Papilio*, thickly fringed with hair anteriorly; eyes smooth. The female after fertilization with an extended corneous anal pouch that varies in shape.

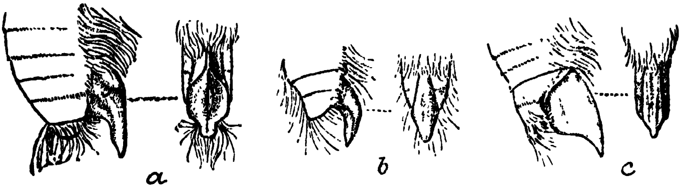

Fig. 31.—Anal pouches of fertilized females of *Parnassius*.
a. P. jacquemonti.
b. P. epaphus.
c. P. hardwickei.

Key to the forms of Parnassius.

A. Fore wing: vein 10 not anastomosed with vein 11.

a. Hind wing upperside: spots of the subterminal series lunular.

a'. ♂ ♀. Cilia of fore wing typically pure white; anal pouch in fertilized ♀ with a strong posterior carina .... *P. jacquemonti*, p. 118.

b'. ♂ ♀. Cilia of fore wing white, always conspicuously alternated with black; anal pouch in fertilized ♀ without carina.

a^2. ♂ ♀. Expanse over 60 mm. ...... *P. epaphus*, p. 120.

b^2. ♂ ♀. Expanse under 55 mm. .... *P. epaphus*, race *sikhimensis*, p. 121.

b. Hind wing upperside: spots of the subterminal series rounded.

a'. Hind wing underside with a conspicuous basal series of red or crimson spots .... *P. hardwickei*, p. 121.

b'. Hind wing underside without a basal series of red spots.

a^2. Termen of hind wing with a more or less well-defined edging of dusky subhyaline black.

a^3. Hind wing upperside: series of subterminal spots complete.

a^4. Hind wing upperside: subterminal spots not centred with blue, no red or crimson subtornal spot .... *P. delphius*, race *stoliczkanus*, p. 123.

b^4. Hind wing upperside: subterminal spots centred with blue, subtornal red or crimson spots present, large and prominent .. *P. delphius*, race *atkinsoni*, p. 125.

b^3. Hind wing upperside: series of subterminal spots not complete.

a^4. Fore wing upperside: discal transverse black band short, typically not extended below vein 5; in Indian specimens extended to vein 1, but always joined to postdiscal band by broad cross band .... *P. delphius*, race *hunza*, p. 124.

b^4. Fore wing upperside: discal transverse band long, extended to dorsal margin, bent inwards below apex of cell, never joined to postdiscal band .... *P. delphius*, race *stenosemus*, p. 125.

b^2. Termen of hind wing without a subhyaline black edging, white-scaled right up to margin .... *P. delphius*, race *whitei*, p. 125.

B. Fore wing: vein 10 anastomosed with vein 11 towards apex.

a. Hind wing upperside: spots of subterminal series formed into large conspicuous pseudocelli.

a'. Hind wing upperside: subterminal series of spots or pseudocelli complete. *P. charltonius*, p. 126.

b'. Hind wing upperside: subterminal series of spots or pseudocelli not complete, posterior two only present .... *P. imperator*, race *augustus*, p. 127.

b. Hind wing upperside: spots of subterminal series lunular.

a'. Termen of hind wing with a more or less well-defined edging of dusky subhyaline black.

a^2. Cilia of both fore and hind wings conspicuously yellowish white .... *P. acco*, p. 128.

b^2. Cilia of fore wing conspicuously black, of hind wing white .... *P. simo*, p. 129.

b'. Termen of hind wing without a subhyaline dusky black edging, white-scaled right up to margin .... *P. simo*, race *moelleri*, p. 130.

561. **Parnassius jacquemonti** (Pl. XV, fig. 99), *Boisduval, Spec. Gén. Lép.* i, 1836, p. 400, ♂ only; *Blanch. Jacq. Voy. Ind., Ins.* 1844, p. 16, pl. 1, fig. 4 *nec* fig. 3; *Oberthür, Étud. Ent.* iv, 1879, p. 23, pl. 2, fig. 5 ♂; *id. tom. cit.* xiv, 1891, p. 10, pl. 2, fig. 11 ♂; *Mackinnon & de N. Journ. Bomb. N. H. Soc.* xi, 1898, p. 596; *Moore, Lep. Ind.* v, 1901–1903, p. 105, pl. 406, figs. 1, 1 *a*–1 *e*, ♂ ♀.

Parnassius actius, *var.* himalayensis, *Elwes, P. Z. S.* 1886, p. 30.

Parnassius jacquemontii, *var.* impunctata, *Austant, Le Naturaliste* (2) xiii, 1899, p. 154.

Parnassius chitralensis, *Moore, Lep. Ind.* v, 1901–1903, p. 107, pl. 406, figs. 2, 2 *a*, ♂.

♂. *Upperside*: pale creamy white; both wings irrorated with diffuse black scales; body, base of the wings and the dorsum of hind wing clothed with long white hairs. Fore wing: the irroration of black scales most dense along the costal margin and at base of cell, more sparse on the disc; the apical two thirds of the cell, a portion beyond the middle of interspace 1, and the bases of interspaces 4, 5, 8 and 9 markedly free of the diffuse black scales; a transverse short bar across the middle of cell, another along the discocellulars, and a diffuse transverse series of postdiscal lunules, black; three or four crimson spots encircled with black arranged as follows:—one midway in interspace 1, two, sometimes three, beyond apex of cell in an oblique line from the costa; the terminal margin broadly hyaline, with minute black specks at the apices of the veins; cilia white. Hind wing: base and dorsal margin beneath the white hairs densely and broadly irrorated with black scales, the inner edge of this border irregular, rest of the wing with more diffuse black scaling; five or six black-encircled crimson spots as follows:—two, sometimes three, obliquely above the tornus, these or one of them occasionally white-centred; one in the middle of interspaces 5 and 7 respectively, these are generally centred with white; and one pure crimson spot at the extreme base of the wing; the postdiscal series of black lunules are as on the fore wing, but the lunules are not so well defined and generally separate from one another; finally there is no distinct hyaline border to the wing, but the cream-white scaling extends to the termen; terminal black specks to the veins and white cilia as on the fore wing. *Underside*: shining, with more or less of a glazed appearance; markings much as on the upperside, but indicated as much by those of the upperside which show through as by actual scaling; in addition on the hind wing there is a subbasal transverse series of four dull crimson spots while the crimson spots beyond are all more or less white-centred. Antennæ deep brownish black, rarely with a few white specks on the underside; head, thorax and abdomen beneath the covering of white hairs, black.—♀. Similar, generally darker with the irroration of black scales more dense; the crimson spots are often larger and more brilliant. Anal pouch after fertilization "ovally scoop-shaped in front, convex beneath," furnished with a sharp high carina posteriorly.

Exp. ♂ ♀ 66–80 mm. (2·6–3·15″).

Hab. The Himalayas from Chitral and Kashmir to Kumaon, at elevations from 11,000 to 13,000 feet.

The above description is taken from as nearly typical specimens as I had access to, but *P. jacquemonti* is an exceedingly unstable form and varies in size, in shade of ground-colour, in the amount and distribution of the black scaling on the wings, and in the number and size of the red or crimson spots, which may or may not be centred with white. These differences are probably partially seasonal. *P. chitralensis*, Moore, is perhaps the most distinct of the varieties, but the genitalia in the ♂ and the anal pouch in the fertilized ♀ are identical with the same organs in typical specimens of *P. jacquemonti* (fig. 31 *a*, p. 116). *P. chitralensis*, Moore, differs from the typical form as follows:—Larger, the ground-colour on the upperside much whiter, the amount of black diffuse scaling on the wings generally much less, the cilia of the wings more or less speckled with black. In many specimens the postdiscal blackish series of lunules on the upperside of the fore wing is very incomplete and does not extend clearly across the wing; in most the antennæ are distinctly ringed with white.

Exp. ♂ ♀ 70–85 mm. (2·75–3·34″).

Hab. Chitral; Kashmir.

Var. *impunctata*, Austant.—"Compared with the typical figure of *P. jacquemontii* as given by Oberthür (*tom. cit.*) this variety is larger in size, equal to *delius* (*i. e.* 70 mm.); of a very pure opaque white on which the spots and dusky black shadings on the disc of the front wings show up strongly. The maculæ of the subterminal band are reduced in size and disjointed especially on the hind wing, where they have a tendency to become obsolete. The two costal spots and the internal spot are not centred with red, there are no carmine markings either at the base of the hind wing or on the anal spot. Antennæ black ringed with grey; cilia as in the typical form, grey without any well-marked intersections of black. Ocelli (on the wings) of a dark red widely encircled with black and without white centres." (*Austant.*)

Hab. Sikhim Mountains.

Unknown to me.

562. **Parnassius epaphus**, *Oberthür.*

Parnassius jacquemontii, *Boisduval, Spec. Gén. Lép.* i, 1836, p. 400, ♀ only; *Blanch. Jacq. Voy. Ind., Ins.* 1844, p. 16, pl. 1, fig. 3 *nec* fig. 4; *Gray* (*nec Boisduval*), *Cat. Lep. Brit. Mus., Pap.* 1852, p. 75, pl. 12, figs. 1, 2, ♂ ♀; *Elwes* (*nec Boisduval*), *P. Z. S.* 1886, p. 36, pl. 2, fig. 1, ♀ anal pouch.

Parnassius epaphus, *Oberthür, Étud. Ent.* iv, 1879, p. 23; *Elwes, P. Z. S.* 1882, p. 399; *Oberthür, op. cit.* xiv, 1891, p. 12, pl. 1, figs. 4, 5, ♂ ♀; *Moore, Lep. Ind.* v, 1901-1903, p. 109, pl. 407, figs. 2, 2 *a*, ♂ ♀.

Parnassius epaphus, *var.* cachemiriensis, *Oberthür, Étud. Ent.* xiv, 1891, p. 14, pl. 1, figs. 6, 7 ♂ ♀, 7 *a* ♀ anal pouch.

Parnassius nirius, *Moore, Lep. Ind.* v, 1901-1903, p. 108, pl. 407, figs. 1, 1 *a*, ♂ ♀.

Race sikhimensis (Pl. XV, fig. 100).

Parnassius epaphus, *var.* sikkimensis, *Elwes, P. Z. S.* 1882, p. 399, pl. 25, figs. 4, 5, ♂ ♀; *Oberthür, Étud. Ent.* xiv, 1891, p. 13.

Parnassius sikkimensis, *Moore, Lep. Ind.* v, 1901-1903, p. 111, pl. 407, figs. 4, 4 *a*, ♂ ♀.

Superficially this form closely resembles *P. jacquemonti*, but besides the structural differences of the anal pouch in the fertilized ♀ (fig. 31 *b*), in markings it differs as follows:—

♂. *Upperside*, fore wing: the crimson black-encircled spots reduced to a minute subcostal dot in the black mark beyond the cell; the subhyaline terminal margin much narrower, with dentate white spots in the interspaces along the actual margin; cilia white, markedly alternated with black at the apices of the veins. Hind wing: the dusky black along the dorsal margin comparatively much broader, its inner border more irregular, deeply bi-emarginate, the crimson centre to the black mark above the tornal angle entirely absent. In no specimens that I have seen are the crimson spots centred with white. *Underside*: with the same glazed appearance as in *jacquemonti*; markings as on the upperside, but on the fore wing the white dentate spots in the terminal row are larger, which give to the wing the appearance of having a subterminal as well as a postdiscal transverse series of dusky-black lunules. On the hind wing the row of basal and the obliquely-placed pre-tornal spots are as in *jacquemonti* but of a duller shade, while as in that form all the crimson spots are broadly centred with white. Antennæ differ from those of *jacquemonti* as they are conspicuously ringed with white.—♀ differs from the ♂ in the dusky black markings on the upperside that are broader, especially the postdiscal series on the fore wing: this generally forms a diffuse band and so often restricts the lunules of the white ground-colour beyond it, blending as it does diffusely with the subhyaline terminal margin. Anal pouch of fertilized ♀ (fig. 31 *b*) differs conspicuously from that of *jacquemonti* ♀ in the complete absence of the posterior high keel or carina.

Exp. ♂ ♀ 62–73 mm. (2·43–2·83").

Hab. N.W. Himalayas from 12,000 to 17,000 feet.

Var. *cachemiriensis*, Oberthür, is probably a seasonal variation from the typical form. On the upperside the ground-colour is whiter, the red markings more pink than crimson, and the black diffuse scaling much restricted in both sexes.

Var. *nirius*, Moore.—The type specimen of the ♀ is now in the British Museum as well as several other females that closely resemble it. I have, however, only seen a single ♂, in which the markings are very similar to those in the ♂ figured by Dr. Moore. All forms of *Parnassius* are so variable that I do not think that *nirius* can be separated from *epaphus*, even as a race. It differs in both these cases from typical *epaphus* chiefly in the absence of the white dentate terminal markings and in the more continuous, transverse, postdiscal, diffuse, dusky-black band on the fore wing; the latter is more of a connected band than a series of lunular markings. In the fertilized ♀ the anal pouch is identical with that of *epaphus*.

Race **sikhimensis**, Elwes, is very similar, but so far as the specimens I have seen, some fifty or sixty, is without exception smaller, though it differs slightly if at all in markings from the typical form. On the whole, perhaps, the wings are more copiously irrorated with black scales, the postdiscal dusky-black series of lunules on the upperside of the fore wing is more evenly curved, and the red spots on the hind wing are more brilliant; in a few specimens the lower discal spot is minutely white-centred; the cilia of the fore wing also are more prominently alternated with black; while the antennæ are less conspicuously ringed with white than in typical *epaphus*. Genitalia in the ♂ and anal pouch in the fertilized ♀ identical with those of the typical form.

Exp. ♂ ♀ 50–54 mm. (1·98–2·13").

Hab. The Chumbi Valley, Sikhim, at and above 16,000 feet, extending to Tibet.

563. **Parnassius hardwickei** (Pl. XV, fig. 101), *Gray, Zool. Misc.* i, 1832, p. 32; *id. Lep. Ins. Nepal*, 1846, pl. 4, figs. 1, 1 *a*; *id. Cat. Lep. Brit. Mus., Pap.* 1852, p. 76, pl. 12, figs. 8, 9, 10, 11; *Elwes, P. Z. S.* 1886, p. 38, pl. 2, fig. 5 ♀ anal pouch; *Moore, Lep. Ind.* v, 1901–1903, p. 111, pl. 408, figs. 1, 1 *a* 1 *g*, ♂ ♀, pl. 409, figs. 1, 1 *a*–1 *g*, ♂ ♀, & pl. 410, figs. 1, 1 *a*–1 *g*, ♂ ♀.

Parnassius jacquemontii, *Kollar* (*nec Boisduval*), *Hügel's Kaschmir*, iv, 1844, p. 407, pl. 2, figs. 3, 4, ♂.

Parnassius charino, *Gray, Cat. Lep. Brit. Mus., Pap.* 1852, p. 76, pl. 12, figs. 13, 15.

Parnassius hardwickii, *var.* albicans, *Fruhstorfer, Iris*, xi, 1898, p. 147; *id.* (*abr.* afer) *Stett. ent. Zeit.* 1899, p. 354.

♂. *Upperside*: creamy-white. Fore wing: base and costal margin densely irrorated with black scales; a broad short velvety black bar across middle of cell, another along the discocellulars and a third beyond apex of cell, this last with superposed spots of crimson where the bar crosses the bases of interspaces 5 and 8; a crimson-centred black spot in middle of interspace 1; an irregularly curved prominent postdiscal series of dusky-black spots, so arranged as to leave a narrow edging of the creamy-white ground-colour beyond, which is traversed by the black veins; the upper four spots of the postdiscal series fused to form a broad, continuous, but short, curved band; the terminal margin broadly dusky black; the cilia white. Both the dusky-black band and the postdiscal dusky-black markings subhyaline. Hind wing: base and dorsal margin broadly dusky black, the inner margin of the black coloration on the latter deeply but irregularly bi-emarginate; a crimson-centred black spot near base of interspace 5, another just beyond the middle of interspace 7, followed by a very conspicuous curved postdiscal series of five dull blue ocelli ringed with black and centred with white, and a narrow diffuse dusky black terminal band; cilia as in the fore wing. *Underside*: similar, with a glassy appearance. Fore wing: with the markings of the upperside visible by transparency; the white scaling of the upperside replaced by scale-like hairs of the same colour; the only scaled markings are the medial and apical transverse black bars in cell, three small crimson spots beyond and the black-encircled crimson spot in middle of interspace 1. Hind wing: the white scaling along the basal half of the costal margin nearly as on the upperside, the rest hair-like as on the underside of the fore wing; a broad basal band of four crimson or vermilion-red spots followed by a discal irregular series of five similarly-coloured spots, the lower three formed into a short obliquely transverse band above the tornal angle; all the crimson spots encircled more or less obsoletely by black rings, and the following prominently centred with white: the spot in interspaces 2 and 5 and the basal and medial spots in interspace 7.— ♀. Similar; the dusky black irroration on the upperside of the fore wing more extensive and formed into a narrow irregular band below the cell, which runs between the crimson spots beyond the cell-apex and the crimson spot in interspace 1; the crimson spots are larger, with an additional spot in interspace 6 of the fore wing and a pretornal spot on the hind wing. *Underside*: similar to that of the ♂ but all the red spots much larger and with white scaling in the centre. Antennæ nearly black, with only a few white specks, head with brownish-yellow pubescence; rest of the thorax and abdomen covered densely with long white hairs which also clothe, more or less narrowly, the dorsal margin of the hind wing.

Exp. ♂ ♀ 60–66 mm. (2·38–2·6″).

Hab. The Himalayas from Kashmir and Kulu to Nepal and Sikhim, at from 7500 to 15,000 feet.

Like all forms in the genus this is largely variable; the black irroration and crimson markings are, in many specimens, much reduced in extent and size; in some also the crimson is replaced by pink. This may be partly seasonal or due to either a drier or a damper habitat. The form named *charino* by Gray is most probably a wet-season or autumn form. It differs from typical *hardwickei* as follows:—♂ ♀. *Upperside*: more or less completely and densely irrorated with dusky black, from which on the fore wing two bars that cross the cell, a short oblique bar beyond its apex, a postdiscal spot near the costa beyond the crimson spots, and a subterminal series of spots stand out conspicuously white; on the hind wing the interval between the basal and postmedial crimson spots in interspace 7 is also prominently white. *Underside*: markings as on the upperside chiefly seen through by transparency, the apex broadly and terminal margin of fore wing and the whole of the hind wing suffused conspicuously with greenish yellow.

564. **Parnassius delphius**, *Eversm.* (Doritis) *Bull. Mosc.* 1843, p. 541, pl. 7, figs. 1 *a*, 1 *b*, ♂.

Race stoliczkanus.

Parnassius stoliczkanus, *Felder, Novara Reise, Lep.* ii, 1865, p. 138, iii, 1867, pl. 69, figs. 2, 3, ♂; *Elwes, P. Z. S.* 1886, p. 40; *Moore* (Koramius), *Lep. Ind* v, 1901–1903, p. 120, pl. 412, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Parnassius delphius, *var.* stoliczkanus, *Gr.-Gr. Rom. Mém.* iv, 1890, p. 148 *et seq.*

Race hunza.

Parnassius delphius, *var.* hunza, *Gr.-Gr. Hor. Soc. Ent. Ross.* xxii, 1888, p. 303; *id. Rom. Mém.* iv, 1890, p. 205, pl. 10, figs. 1 *a*, 1 *b*, ♂ ♀.

Race stenosemus.

Parnassius delphius, *var.* stenosemus, *Honrath, Ent. Nachricht.* xvi, 1890, p. 127.

Koramius stenosemus, *Moore, Lep. Ind.* v, 1901–1903, p. 122, pl. 412, figs. 3, 3 *a* 3 *c*, ♂ ♀.

Race atkinsoni.

Koramius atkinsoni, *Moore, Lep. Ind.* v, 1901-1903, p. 121, pl. 412, fig. 2 ♀.

Race whitei.

Parnassius delphius, *race* whitei, nov. st.

Typical *delphius* has not been recorded from within our limits, but the varieties described below seem fairly constant in coloration, and may be ranked as races of one protean form.

Race **stoliczkanus**, Felder.—♂. *Upperside*: dull white. Fore wing: base and costal margin irrorated with black scales; cell with the usual medial and apical short black transverse bars, the former not extended down to the median vein in typical specimens;

discal and postdiscal dusky black sinuate bands, the former attenuated below vein 6, stops short of the dorsum, the latter extends right down to the dorsal margin; beyond these bands the terminal margin is more or less shaded with dusky black which at the tornus coalesces with the postdiscal band. Hind wing: dorsal margin broadly dusky black, this colour narrowed towards the tornus; a postdiscal black-encircled red spot in interspace 5; termen somewhat broadly dusky black, with a subterminal series of darker spots in the interspaces and the dorsal margin fringed with long white hairs. Cilia of both fore and hind wings white. *Underside*: like the upperside, the ground-colour with the glassy appearance common to all forms in the genus; markings similar, apparent however more by transparency from above than formed by actual scaling. Antennæ, head, thorax and abdomen black, the tufted hairs on the head in front fuscous; beneath: the palpi, thorax and abdomen clothed with fuscous hairs.—♀. *Upperside*: the ground-colour differs from that of the ♂ in its duller somewhat yellowish tint; the markings are similar but on the hind wing the spots in the subterminal series are centred with blue, the postdiscal red spot is paler, often absent, while in some specimens there is a subtornal red spot. *Underside*: similar to that of the ♂. In both sexes the basal red spots on the underside of the hind wing so general in the forms of this genus are usually, if not always, lacking. Antennæ, head, thorax and abdomen as in the ♂. Anal pouch in the fertilized ♀ as in race *hunza*, fig. 32 *a*, *b*.

Exp. ♂ ♀ 50–59 mm. (1·97 2·33″).

Hab. N.W. Himalayas; Ladakh: the Bara Lacha Pass north of Lahaul at 18,000 feet; Runang and Hungruny Passes at 16,000 feet.

Race **hunza**, Gr.-Gr.—This race closely resembles the preceding but is somewhat variable. ♂ ♀. *Upperside*: ground-colour duller, more sullied white. Fore wing: the discal band in typical specimens very much shorter, not extended below vein 5, but in all specimens that I have seen that have been taken within our limits, the discal band reaches vein 1, and where it crosses interspace 3 is joined on to the postdiscal transverse band by a broad cross-bar, that extends right up to the base of that interspace. Hind wing: the subterminal series of dark spots reduced to one or two near the tornus, the anterior spots (except the spot in interspace 7) replaced by a curved band of somewhat lunular spots that extends unbroken between the

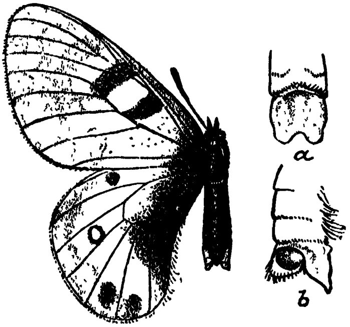

Fig. 32.
Parnassius delphius, race *hunza*, ♀.
a, *b*. Anal pouch.

spot in interspace 3 and that in interspace 7. *Underside*: similar to the underside in race *stoliczkanus*, with no red spots at the base of the hind wing; in a few specimens a discal and a subcostal black-encircled red spot are present. Antennæ, head, thorax and abdomen as in *stoliczkanus*. Anal pouch in the fertilized ♀ as in fig. 32 *a*, *b*.

Exp. ♂ ♀ 68–72 mm. (2·70–2·82″).

Hab. Within our limits: Chitral, extending northwards into the Hindu Khush.

Race **stenosemus**, Honrath.—♂ ♀. *Upperside*: ground-colour as in *stoliczkanus* and *hunza*. The markings differ from those of *stoliczkanus* chiefly as follows:—*Upperside*: the discal transverse band on the fore wing more strongly sinuate, in most specimens bent inwards beneath the apex of the cell; both discal and postdiscal bands comparatively broader, more heavily marked; in no specimen that I have seen is there any broad diffuse band of dusky black scaling joining the two bands as in the Indian form of *hunza*. Hind wing: the red spot in interspace 5 placed more inwards, closer to the apex of the cell and more heavily encircled with black, sometimes the red is absent and the spot is entirely black; beyond this there is a comparatively broad postdiscal dark band on which is superposed a nearly complete series of black spots, the posterior four of which are centred with blue; this is followed by a very narrow band of the ground-colour, sometimes complete, more often indicated by white lunular more or less detached markings, and a narrow dusky-black terminal edging bounded by an anticiliary jet-black line. *Underside*: glassy, more or less like the upperside, the markings indicated more by transparency from above than by actual scaling. Antennæ, head, thorax and abdomen, and in the fertilized ♀ the anal pouch, as in the races *stoliczkanus*, *hunza*, &c.

Exp. ♂ ♀ 66–74 mm. (2·60–2·92″).

Hab. Ladakh: Kutie Pass, 17,000 feet.

Race **atkinsoni**, Moore.—♀. Similar to *stenosemus*, Honrath, but can at once be recognized by the very large and conspicuous tornal and discal red spots, which are encircled with black, on the upperside of the hind wing.. The subterminal series of spots on the same wing is complete and all the spots are centred with blue.

Exp. ♀ 60 mm. (2·37″).

Hab. The Pir Pingal range, N. Kashmir.

Male unknown.

Race **whitei**, nov. st.—♂. *Upperside*: dusky greyish black. Fore wing: basal fourth white with a slight irroration of black scales; a preapical broad transverse bar in cell, a short similar obliquely-placed bar beyond, that reaches from just below the costal margin to base of vein 4, and transverse discal and subterminal complete bands, white; the latter two are crossed by the black veins, and thereby have the appearance of two transverse series of spots; the discal band anteriorly curved inwards, the subterminal band feebly bisinuate; the black scaling is very dense and sharply defined on the dark medial and discocellular areas in the cell, and therefore appears like black transverse bars; termen with a very slender jet-black anticiliary line. Hind wing: dorsal half clothed with recumbent long white hairs; a discal prominent red spot in interspace 5, and a similar spot in interspace 7, round each of which the black scaling of the ground-colour is very dense and forms a more or less conspicuous ring; terminal third of the wing dull white with a subterminal black spot in interspace 2, another slightly larger similar spot that is centred with a minute spot of blue scales in interspace 3, and above the latter a bisinuate dusky-black transverse sinuous streak that extends to and broadens at the apex of the wing. Cilia of both fore and hind wings prominent and yellowish white in colour. *Underside* with the usual glassy glazed appearance; the markings similar, but seen chiefly by transparency from the upperside; only the red spots, an additional similar spot at base of interspace 7 on the hind wing, and a black spot on the discocellulars of the fore wing marked by actual scaling, not merely seen by transparency from above. Antennæ black with a few scattered minute yellow specks; head, thorax and abdomen covered with long black hairs; beneath: the palpi, thorax and abdomen yellowish white.

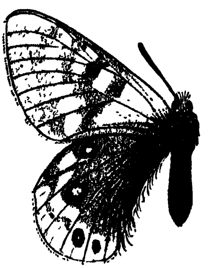

Fig. 33.—*Parnassius delphius*, race *whitei.*

Hab. Sikhim, 16,000 to 19,000 feet.

This is one of the many races? or varieties? of *P. delphius*, Eversmann, and is closest to the race? or var.? *staudingeri*, Bang-Haas. The type and only specimen was procured by Mr. Claude White and was sent to Mr. F. Möller of Darjiling for identification, Mr. Möller kindly forwarded it to me.

This race of *P. delphius*, Eversmann, differs from its nearest ally *P. delphius*, race *staudingeri*, by the form of the markings on the fore wing, and notably by the white scaling on the hind wing, which is carried right up to the terminal margin from apex to tornus. In *staudingeri* and, in fact, in all the many races of *P. delphius*, the terminal edging to the hind wing is markedly dusky subhyaline black.

565. **Parnassius charltonius**, *Gray, Cat. Lep. Brit. Mus., Pap.* 1852, p. 77, pl. 12, fig. 7 ♀; *Moore, Sci. Res. Sec. Yark. Miss., Lep.* 1879, p. 5, pl. 1, fig. 3 ♂; *Elwes, P. Z. S.* 1886, p. 43, pl. 3, fig. 5 ♀ anal pouch; *Moore* (Kailasius), *Lep. Ind.* v, 1901-1903, p. 118, pl. 411, figs. 3, 3*a*, 3*b*, ♂ ♀.

♂. *Upperside*: creamy-white. Fore wing irrorated with black scales at base, along costal margin narrowly and below the upper half of cell at base of interspaces 2 and 3; cell with the usual medial and apical short broad transverse black bars; a short broad, similar, but obliquely placed bar beyond apex of cell from costa to vein 4, its lower portion below vein 5 narrower and bent inwards at an angle; a postdiscal transverse black bar attenuated towards the dorsum and dislocated inwards below vein 5; followed by a broad, posteriorly narrowed, subhyaline terminal edging; cilia white. Hind wing: base and dorsal margin, for four-fifths of its length, broadly and densely irrorated with black scales; a short oblique pretornal dusky-black bar, rarely centred with pink or carmine; a very large pink to deep crimson ocellus, ringed with black and centred with white, in interspaces 4 and 5, crossing vein 5, and a much smaller black spot sometimes centred minutely with pink or crimson in middle of interspace 7; beyond this a postdiscal curved series of five velvety-black spots, each touched inwardly with silvery, superposed on a broad subhyaline dusky transverse band, which is broadest in the middle and is followed by a subterminal, somewhat narrow, dusky-black band, interrupted at the veins; cilia white. *Underside* similar, with a glassy appearance and similar markings, seen chiefly, however, by transparency from the upperside. Antennæ, head, thorax and abdomen black, antennæ with some few minute white specks; beneath: head and thorax anteriorly with olivaceous pubescence, thorax posteriorly and abdomen covered with long white hairs, which also clothe the dorsal margin of the hind wing.—♀. *Upper* and *under sides* similar to those in the ♂; differs in the black markings which are broader, the red ocelli on the hind wing that are considerably larger, and in the obliquely placed pretornal short bar that is always centred with red.

Exp. ♂ ♀ 74–96 mm. (2·91–3·78").

Hab. Ladakh, Chitral, extending into Tibet, at elevations from 9,000 to 15,000 feet.

The range of variation in *charltonius* is more limited than in most of the forms belonging to *Parnassius*. The width and extent of the black markings and in a lesser degree the size of the red ocelli on the hind wing are the chief variable points. There seems to be little or no seasonal variation.

566. **Parnassius imperator**, *Oberthür, Bull. Soc. Ent. Fr.* 1883, p. 79.

Race augustus (Pl. XV, fig. 102).

Parnassius imperator augustus, *Fruhstorfer, Soc. Ent.* xviii, 1903, p. 113.

Race **augustus**, Fruhstorfer.—♂ ♀. *Upperside*: creamy-white. Fore wing: costa and base closely irrorated with black scales; the usual short transverse medial and apical black bars across the cell, followed by irregularly sinuous, broad, transverse, dusky-black discal and postdiscal, complete bands that extend from the costa to the dorsum; the discal band very broad, below the apex of cell bent inwards and almost completely filling the base of interspaces 2 and 3; the terminal margin broadly dusky hyaline black. Hind wing: the dorsal margin up to the subcostal vein and downwards to a little above the tornus densely irrorated with black scales and with scattered long white hairs; an upper basal black-encircled crimson spot; another in the middle of interspace 7 and a third in interspace 5, the latter two centred with white; beyond there is an irregular, sinuous, postdiscal dusky-black transverse band from costa to vein 4, posterior to which in interspaces 2 and 3 are two prominent round black subtornal spots, broadly centred with blue; lastly, the terminal margin narrowly dusky black. Cilia of both fore and hind wings prominently yellowish white. *Underside* similar; glassy markings similar, but mostly seen by transparency from above; faint indications of an additional crimson spot at base of cell and base of interspace 1. Antennæ brownish black, obscurely annulated with brown; head, thorax and abdomen black, the latter two studded with long white hairs.

Exp. ♂ ♀ 79–84 mm. (3·1–3·35″).

Hab. Eastern Himalayas, on the boundary between Sikhim and Tibet, at altitudes between 15,000 and 16,000 feet.

This smaller and darker form of *P. imperator*, Oberthür, from Eastern Tibet, just enters into our limits.

567. **Parnassius acco,** *Gray, Cat. Lep. Brit. Mus., Pap.* 1852, p. 76, pl. xii, figs. 5, 6, ♀; *Bates, in Henderson & Hume's 'Lahore to Yarkand,'* 1873, p. 305, fig.; *Elwes, P. Z. S.* 1886, p. 35; *Moore* (Tadumia), *Lep. Ind.* v, 1901–1903, p. 116, pl. 411, figs. 1, 1 *a*–1 *c*, ♂ ♀.

♂ ♀. *Upperside*: dull greyish white. Fore wing: costal margin and base with an irroration of black scales, the white scaling clearest and most dense in the cell, this last crossed by a medial and an apical short, broad, transverse jet-black band; beyond apex of cell an irregularly sinuous dusky-black discal band that usually extends from costa to vein 3, but in some specimens right up to the dorsal margin, in most it bears an anterior crimson spot; this is followed by less irregular and, in most specimens, slightly broader postdiscal and terminal similar transverse bands and a pre-ciliary slender continuous line on termen and dorsum. Hind wing: dorsal half of the wing dusky black, the outer or upper margin of this colour, irregularly indented; a discal, a subcostal and a basal black-encircled spot that varies in colour from crimson to pinkish yellow, followed by a subterminal series of black lunular spots and a narrow terminal band, crossed and interrupted by the white veining. Cilia of both wings conspicuously white. *Underside* with a glassy appearance. Fore wing nearly as on the upperside, but the black markings, except the two bars across the cell, only seen through by transparency from the upperside. Hind wing: ground-colour white, the discal, costal, and basal pink or crimson spots also apparent by transparency only from the upperside; a discal double ill-defined series of black lunular markings, followed by a subterminal series of similar markings like those on the upperside, but of a duller black and less clearly defined. Antennæ dull brownish black, with a more or less copious covering of scattered white scales; abdomen black, clothed with somewhat sparse, long, fine white hairs.

Exp. ♂ ♀ 52–70 mm. (2·06–2·78").

Hab. The Himalayas from the Karakoram to Sikhim, at elevations of over 16,000 feet; Tibet.

568. **Parnassius simo,** *Gray, Cat. Lep. Brit. Mus., Pap.* 1852, p. 76, pl. 12, figs. 3, 4, ♂ ♀; *Elwes, P. Z. S.* 1886, p. 35; *Oberthür, Études Ent.* xiv, 1891, p. 14, pl. 1, figs. 8, 9.

Race moelleri.

Parnassius simo, *race* moelleri, nov. st.

♂. *Upperside*: dull white, the veins black. Fore wing at base and along the costal margin lightly irrorated with black scales; a black medial transverse bar with even parallel sides across the cell, and a broader black bar on the discocellulars, this latter with a more or less outwardly curved exterior edge; beyond this a bisinuate discal and an outwardly curved postdiscal transverse black band, both extended from the costa to vein 1; the discal band generally more or less obsolescent and ill-defined below veins 3 or 4, but well marked between veins 1 and 2; the outer edge of the postdiscal band with a tendency to be very narrowly continued outwards along the veins; terminal margin dusky subhyaline black, bounded by an anticiliary jet-black slender line: cilia dusky black. Hind wing: base and dorsum broadly and heavily shaded with black, sparsely covered with long recumbent white hairs that become fuscous along the extreme edge of the dorsum: the black occupies the basal half of the cell and extends along the lower margin of its apical half to base of vein 4, from whence it narrows and is carried obliquely down to near the tornal angle; beyond the cell there are two black-encircled red spots, one in interspace 5, the other in interspace 7: these are followed by a postdiscal, generally complete, curved series of black lunular marks and a narrow terminal dusky-black band, bounded by an anticiliary jet-black line as on the fore wing; cilia yellowish white. *Underside*: with the usual glassy appearance, the markings of the upperside showing through by transparency; the following, however, are marked more or less by actual scaling:—the medial and apical black cellular bars on the fore wing; the red black-encircled spots on the hind wing, with three additional red spots outwardly margined with black at the base of the same wing, the posterior two of these basal red spots are large and somewhat pear-shaped.

Antennæ, head, thorax and abdomen black; the head above fuscous; beneath: the palpi, thorax and abdomen with dusky fuscous pubescence, mixed on the thorax and abdomen with long white hairs.—♀. Similar, but in the specimen in the collection of the British Museum marked as the type, on the upperside of the hind wing the red in the discal spot in interspace 5 has disappeared, the same colour in the spot in interspace 7 is reduced to a minute speck, and on the underside the middle red spot of the basal three only is present, much reduced in size. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 48-50 mm. (1·89–1·99″).

Hab. Ladakh, 16,000 feet (*Major Charlton*); Tibet.

This seems to be an extremely rare form. Mr. Elwes in 1886 remarked (*t. c.*):—"Of this species almost nothing is known; there exists in all museums to my knowledge but four specimens —two in the British Museum, collected by Major Charlton in Ladak, and two others, of which one is in the Hewitson and one in M. Oberthür's collection." There are now in the British Museum the original types named, described and figured by Gray, the specimen from the Hewitson collection, and a fourth according to the information on the label from Tibet, taken in July 1896 at an elevation of 18,000 feet, and presented to the Museum by Mr. A. Pike.

Race **moelleri**, nov. st.—Closely resembles the typical form, from which, however, it is distinguished as follows:—

Upperside—fore wing: the postdiscal transverse dusky-black band broader and situated closer to the termen than in typical *simo*; between this band and the black terminal edging is a transverse band of the ground-colour, divided by the crossing of the veins into a prominent series of spots. Hind wing: no black edging to the termen, the white scaling extended right up to the margin, bounded by the slender anticiliary black line. *Underside*: similar; the markings as in the typical form, with the exception chiefly of the red spots seen more by transparency from the upperside than indicated by actual scaling.

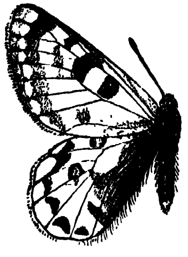

Fig. 34.
Parnassius simo, race *moelleri*.

Exp. ♂ ♀ as in the typical form.

Hab. Sikhim, at elevations of 16,000 feet and over.

Several specimens were taken by Mr. Claude White, and kindly sent to me by Mr. F. Möller of Darjiling, after whom I have named this well-marked race.

Genus HYPERMNESTRA.

Ismene, *Nickerl (nec Swainson), Stett. ent. Zeit.* 1846, p. 207.
Hypermnestra, *Ménétriés, Cat. Mus. Petr., Lep.* Pt. i, 1855, p. 7.

Type, *H. helios*, Nick., from Turkestan.

Range. Turkestan, Persia, Baluchistan.

♂ ♀. Fore wing: costa almost straight for three-fourths of its length from base, the apical fourth arched; apex blunt; termen straight or very slightly convex; tornus broadly rounded; dorsum straight; cell slightly longer than half length of costa; vein 6 and 7 closely approximate at base, upper discocellular therefore very short, barely indicated; middle discocellular concave, long; veins 4 and 5 also closely approximate, lower discocellular therefore very short; vein 8 absent; vein 9 from apical half of 7, terminating below apex of wing; veins 10 and 11 free, 10 from just below upper apex of cell, 11 from upper third of subcostal; vein 12 terminates on costa well beyond upper apex of cell; veins 12, 11, and 10 run very close together towards their apical halves, but neither anastomose nor touch. Hind wing elongate, irregularly pear-shaped; costa slightly arched, the curve continued abruptly and strongly along the termen, tornal angle distinct; dorsum widely emarginate; cell somewhat longer than half the wing; veins 4 and 5 more or less approximate, but not closely so, the discocellular between their bases erect; precostal vein curved outwards. Antennæ short, about one-third the length of costa of fore wing; club short, abrupt, spatulate; head hairy in front, eyes smooth; palpi suberect, with a thick fringe of hairs anteriorly; thorax and abdomen moderately stout.

This genus, or possibly only subgenus, is very close to *Parnassius*, from which it differs in the venation of the fore wing. In *Hypermnestra* veins 6, 7, 10 and 11 in the fore wing are closely grouped together and emitted near the upper apex of cell, the discoidal cell itself is proportionately narrower and the middle discocellular is obliquely placed. The chief difference, however, between the two genera is in the shape of the club of the antennæ. In *Parnassius* this is elongate, gradual and rounded; in *Hypermnestra* short, abrupt and flattened.

569. **Hypermnestra helios,** *Nickerl* (Ismene), *Stett. ent. Zeit.* 1846, p. 208; *Ménétriés, Cat. Mus. Petr., Lep.* i, 1855, p. 7.
Doritis ismene, *Herr.-Schäff. Schmett. Eur.* vi, 1851, p. 35.
Hypermnestra helios, *var.* maxima, *Gr.-Grshim. Rom. Mém.* iv, 1890, p. 141.
Parnassius balucha, *Moore, A. M. N. H.* (7) xviii, 1906, p. 47.

♂. *Upperside*: white, with a slight cream-yellow tint. Fore wing: base densely, costal margin lightly, irrorated with black scales; cell with a transverse black median and a black apical spot, the latter extends from the costa along the discocellulars almost to the lower apex of cell; beyond the cell an oblique, short black bar, widened posteriorly and with three superposed red spots, the middle spot minute, sometimes absent; this is followed by an irregular subterminal black band, widened at the veins, widest near the costa, and gradually narrowed to a faint line posteriorly. In many specimens this band is not extended below vein 5, in others it reaches or almost reaches the tornal angle and is joined in its extension downwards to a prominent black transverse spot in interspace 3. Beyond this band the apex is marked with a small diffuse black patch, and the apices of the veins with black spots that are extended inwards to the subterminal band. Hind wing: base and dorsal margin broadly irrorated with black scales: a black upper discal and a subcostal spot, both generally centred with red; a subterminal series of slender black lunules, followed by a terminal row of transversely linear black spots; the middle and postdiscal areas of the wing darkened by the markings of the underside that show through by transparency. Cilia of both fore and hind wings white alternated with black. *Underside*: ground-colour similar. Fore wing: markings as on the upperside, but the cellular spots, the spot in interspace 3 and the short bar beyond apex of cell larger, more intensely black, the red spots on the last also larger; the subterminal and terminal markings paler, more diffuse. Hind wing with basal, median and subterminal broad transverse bands of irrorated black scales, all the bands with their margins uneven and zigzag; the outer margin of the basal band with four transversely placed red spots, and transverse red discal spots edged with black in interspaces 1, 2, 5 and 7; the termen margined with a fine, more or less interrupted, black line. In a few specimens the red spots are more or less obsolescent. Antennæ pale yellowish white, the shafts obscurely ringed with black head, thorax and abdomen black, the

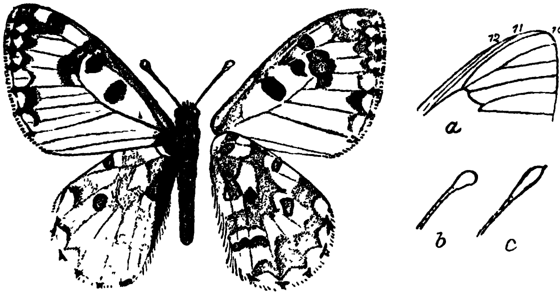

Fig. 35.—*Hypermnestra helios*.
a. Venation of apex of fore wing.
b. Club of antennæ of *Hypermnestra*.
c. „ „ *Parnassius*.

head and the thorax anteriorly with long greyish-white hairs; beneath: the palpi, thorax, legs and basal portion of the abdomen similarly clothed.—♀. Differs from the ♂ as follows:—*Upperside*: all the markings larger and more conspicuous; an additional large black spot in the middle of interspace 1. *Underside*: similar to that of the ♂, but with the additional black spot as noted above.

Exp. ♂ ♀ 52–66 mm. (2·02–2·60″).

Hab. Baluchistan, within our limits, and northwards through Persia to Turkestan and the western shores of the Caspian Sea.

The above descriptions are drawn—that of the ♂ from a ♂ from Baluchistan, type of Moore's *Parnassius balucha*, which is now in the British Museum; that of the ♀ from a specimen in my own collection from Southern Persia. Both belong to the larger form, var. *maxima*, Gr.-Gr., a series of which from Turkestan is in the British Museum. The difference between this variety and typical *helios* is chiefly one of size, though the markings in typical *helios* are possibly duller and smaller, but these characteristics are very variable.

In the British Museum collection also there is a single prepared specimen of a larva from the Christoph collection, labelled *helios*. This is 38 mm. in length, cylindrical, of a pale yellowish-white colour, with four longitudinal rows, two medial and one lateral on each side, of rather large yellow spots; the head is a darker yellow, and each of the succeeding segments bears a transverse series of small black spots, the middle two round and sharply defined, the others irregular, some minute and mere dots, others slightly elongate; each transverse row ends on either side with a spot above the spiracles.

Family PIERIDÆ.

Egg. "Ampulliform, shaped like a sodawater-bottle, twice as high as wide, forming a short neck or stalk close to the apex; radiate, with strong anastomosing ribs." (*Doherty.*)

Larva. More or less cylindrical, depressed, very slight, tapered towards each end; pubescent, the hairs short and fairly dense, each from a minute tubercle; occasionally the hairs are long and sparse; prothoracic segments without protrudable tentacles, like those in the *Papilionidæ*. Colour generally green. Feeds chiefly on plants that belong to the natural orders *Leguminosæ* and *Capparidaceæ*.

Pupa. Angulated, the head pointed, sometimes produced into a long snout; suspended perpendicularly and sustained by a single silken girth.

Imago. Wings comparatively ample; their terminal margins entire, very exceptionally angulated at the apices of one or more of the veins; discoidal cells of both fore and hind wings closed; in a few forms the discocellulars attenuated, but never absent. Among the *Pieridæ* specialization in the veining of the wings seems to have been directed more to the fore than to the hind wing. In the former wing the median series of veins has been most affected. In the Indian genera of the *Pieridæ*, vein 6 is very exceptionally emitted from the cell; in most it has shifted up and is thrown off from the lower side of vein 7 beyond the apex of the cell; thus the upper discocellular veinlet is absent. In one genus (*Baltia*) vein 5 even has been similarly moved forward and is emitted from vein 7, so that in this genus there is only one discocellular veinlet. The radial system of veins has also been modified. In only two of the Indian genera is vein 8 present. In the others it has been shifted up and crowded out at the apex of the wing. The point at which vein 9 is emitted from vein 7 is very variable, and in more than one genus it forms a minute fork with vein 7, very close to the apex of the wing, so that it is merely rudimentary, while in one or two other genera it has completely disappeared. The position of vein 10 is similarly variable, but in no Indian genus has it completely disappeared, and only in two genera is it shifted up and emitted beyond the cell.

Specialization in the veining of the hind wing is not so conspicuous. In one or two genera the precostal vein or spur is absent, but in all there is one vein more than in the *Papilionidæ*. This vein, 1 *a*, gives peculiar breadth to the dorsal margin of the wing, which is channelled to receive the abdomen. Antennæ elongate with a more or less ovate club, or short and thickened gradually to the apex. Legs: all six present and functional; tibiæ of the fore legs without the pad so conspicuous in the *Papilionidæ*;

claws of the tarsi bifid; pulvilli and paronychia generally present. Coloration in the vast majority chiefly or partially white, whence the forms in the family have acquired the distinctive appellation of "the whites."

A summarized account of the habits of the Indian *Pieridæ* in the larval state has been given by Messrs. Davidson, Bell, and Aitken in the 'Journal of the Bombay Natural History Society,' vol. x, 1896, p. 569. I venture to quote it in full here:—

"All the larvæ of this subfamily lie, when full-grown, on the upperside of the leaf, and when solitary (some of them are gregarious) along the mid-rib, coating the leaf where they lie with a bed of silk. The eggs are generally laid singly on the upperside of the leaf or on young shoots; exceptions to this are ****Teracolus* *amata*, Fabr., *Appias hippoides*, Moore, and *Delias eucharis*, Drury (this last is aberrant also, in that the eggs are laid on the underside of the leaf where the larvæ herd together), *Belenois mesentina*, Cramer, *Terias silhetana*, Wallace, which lay their eggs in clusters; the larvæ of these when young are gregarious, but generally when full-grown separate where the food is plentiful."

Of the eggs these authors say:—"The egg of the subfamily is spindle-shaped, standing on one end, and is also more or less strongly ridged longitudinally and striated finely transversely; in colour it is generally pure white, turning to yellow or orange; that of *Nychitona* (*Leptosia*) *xiphia*, Fabr., is blue and that of *Huphina* blotched with red."

The remarkable habit in butterflies of this family of migrating in large numbers together, has attracted the attention of travellers and naturalists in all parts of the world. No satisfactory explanation of the reason for these migrations has yet been offered. It is a wonderful sight—the clouds of butterflies, chiefly Pierids and by far the greater number of them belonging to the genera *Appias* and *Catopsilia*, stream past for hours at a time, all going in one direction, and in all instances that I have witnessed flying against the wind. One effect of these migrations is wide dispersal and the consequent breaking-down of distinctions between local races, for any little peculiarity due to isolation and environment stands little chance of perpetuation, swamped as it is by the continual arrival of forms from other localities. A long series of *Appias*, for example, from widely-separated localities shows variation to a limited extent, and that unstable in itself and scarcely to be defined in words.

Much attention has been paid to the phylogeny of the *Pieridæ*, perhaps more than to that of any other group of the diurnal Lepidoptera. In butterflies, however, as in all living things, specialization has taken an irregularly-radiating rather than a linear course, so that any arrangement of genera in sequence can never be a true indication of the actual line of descent. The following key to the genera of the *Pieridæ* is therefore purely artificial.

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* In this work the names of the butterflies mentioned stand as *Colotis amata*, Fabr., *Appias hippo*, Cramer, *Delias eucharis*, Drury, *Anaphæis mesentina*, Cramer, *Terias silhetana*, Wallace, and *Leptosia xiphia*, Fabr.

Key to the Genera of the Pieridæ.

- A. Fore wing: vein 8 absent.
  - *a*. Fore wing: vein 9 absent.
    - *a'*. Fore wing: vein 10 emitted from subcostal vein .... LEPTOSIA, p. 137.
    - *b'*. Fore wing: vein 10 emitted from vein 7 .... DELIAS, p. 139.
  - *b*. Fore wing: vein 9 present in ♂ and with one exception in ♀ also.
    - *a'*. Fore wing: costa serrated .... PRIONERIS, p. 150.
    - *b'*. Fore wing; costa not serrated.
      - *a²*. Fore wing: vein 11 anastomosed with vein 12 .... ANAPHÆIS, p. 155.
      - *b²*. Fore wing: vein 11 not anastomosed with vein 12.
        - *a³*. Fore wing: vein 5 emitted from vein 7, only one discocellular present .... BALTIA, p. 158.
        - *b³*. Fore wing: vein 5 emitted from cell.
          - *a⁴*. Fore wing: vein 6 emitted from vein 7.
            - *a⁵*. Fore wing: vein 10 emitted from subcostal vein.
              - *a⁶*. Hind wing: precostal vein present.
                - *a⁷*. Hind wing: termen rounded, not angulated at apex of vein 4.
                  - *a⁸*. Fore wing: vein 6 emitted from about middle of vein 7. APORIA, p. 160.
                  - *b⁸*. Fore wing: vein 6 emitted from vein 7 closer to its base than to its apex.
                    - *a⁹*. Fore wing: vein 11 emitted from subcostal vein closer to its apex than to its base.
                      - *a¹⁰*. Fore wing: vein 9 emitted from vein 7 very close to its apex, sometimes absent.......... PIERIS, p. 167.
                      - *b¹⁰*. Fore wing: vein 9 emitted from vein 7 further from its apex and always present.
                        - *a¹¹*. ♂ without specialized tufts of stiff hairs on anal segment.
                          - *a¹²*. Fore wing: apex not falcate.
                            - *a¹³*. Fore wing: bases of veins 6 and 10 equidistant from apex of cell. Hind wing: lower discocellular straight . HUPHINA, p. 181.

b^{13}. Fore wing: base of vein 6 closer to apex of cell than is base of vein 10. Hind wing: lower discocellular concave .... Ixias, p. 192.

b^{12}. Fore wing: apex falcate .... Lade, p. 216.

b^{11}. ♂ with specialized tufts of stiff hairs on anal segment.

a^{12}. Fore wing: vein 9 present in both sexes, emitted from apical fourth of vein 7.... Appias, p. 197.

b^{12}. Fore wing: vein 9 present in ♂, absent in ♀, emitted when present very close to apex of wing .... Saletara, [p. 217.

b^{9}. Fore wing: vein 11 emitted from subcostal vein about equidistant from its base and apex .... Catopsilia, [p. 218.

b^{7}. Hind wing: termen not rounded, strongly angulated at apex of vein 4 .... Dercas, p. 225.

b^{6}. Hind wing: precostal vein absent.

a^{7}. Hind wing: termen more or less acutely angulated at apex of vein 4 .... Gonepteryx, [p. 228.

b^{7}. Hind wing: termen evenly rounded .... Terias, p. 244.

b^{5}. Fore wing: vein 10 emitted from vein 7 .... Colias, p. 232.

b^{4}. Fore wing: vein 6 from upper apex of cell .... Colotis, [p. 259.

c^{4}. Fore wing: vein 6 from junction of upper and middle discocellulars .... Hebomoia, [p. 273.

B. Fore wing: vein 8 present *.

a. Fore wing: vein 6 from upper apex of cell .... Pareronia, [p. 276.

b. Fore wing: vein 6 from vein 7 .... Synchloe, [p. 179.

Genus LEPTOSIA.

Leptosia, *Hübner, Verz. bek. Schmett.* 1816, p. 95; *Distant, Rhop. Malay.* 1885, p. 287: *Kirby in Allen's Nat. Libr.* ii, 1896, p. 176; *Moore, Lep. Ind.* vii, 1906, p. 19.

Nychitona, *Butler, Cist. Ent.* i, 1870, pp. 34, 41; *Moore, Lep. Ceyl.* i, 1881, p. 117.

Type, *L. xiphia*, Fabr., from India.

Range. Indo-Malayan Region; China.

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* Absent in one of the two forms of *Synchloe* found within our limits.

♂ ♀. Fore wing: costa slightly arched, apex very broad and greatly rounded; termen convex; tornus obtuse; dorsum straight, only a little shorter than the costa; cell long, more than half length of wing; veins 5 and 7 closely approximate at base, vein 6 from lower side of vein 7, upper and middle discocellulars therefore both absent, lower discocellular strongly concave; apical portion of median nervure between veins 3 and 4 bent upwards at an obtuse angle; veins 8 and 9 both absent, vein 10 from just before apex of cell, vein 11 from middle of subcostal. Hind wing: costa very slightly arched; termen strongly arched; dorsum straight or slightly arched; cell elongate, more than half length of wing; lower discocellular long, concave; vein 7 from apical third of subcostal; vein 8 slightly curved at base, then straight, extended very close along the costal margin; precostal vein or spur short, inclined inwards. Antennæ slender, not quite half the length of the fore wing; club long, gradual, slightly flattened; palpi slender, third joint fusiform; eyes naked; body slender.

Only a single form of this genus is known, a delicate creature of feeble flight that slowly flutters about the undergrowth and brushwood in the localities where it occurs. In India, according to the MS. notes left by the late Mr. de Nicéville, it has acquired the trivial name of the "wandering snowflake."

570. **Leptosia xiphia**, *Fabr.* (Papilio) *Spec. Ins.* ii, 1781, p. 43; *Moore* (Nychitona), *Lep. Ceyl.* i, 1881, p. 118, pl. 46, figs. 6, 6 *a*; *Distant, Rhop. Malay.* 1885, p. 288, pl. 26, fig. 8; *Daridson, Bell, & Aitken* (Nychitona), *Jour. Bomb. N. H. Soc.* x, 1897, p. 569; *Moore, Lep. Ind.* vii, 1906, p. 20, pl. 559, figs. 1, 1 *a*, 1 *b*, ♂ ♀.
Leptosia nicobarica, *Moore, Lep. Ind.* vii, 1906, p. 22.

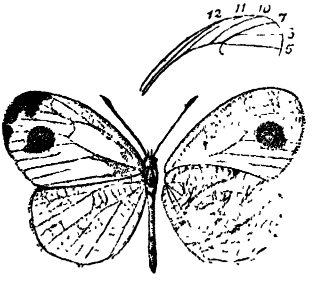

Fig. 36.—*Leptosia xiphia.*

♂. *Upperside*: white; base of wings very slightly powdered with minute black scales. Fore wing: costa speckled obscurely with black; apex black, the inner margin of this inwardly angulate; a very large somewhat pear-shaped postdiscal spot also black. Hind wing white, uniform; in most specimens an obscure, extremely slender, terminal black line. *Underside*: white; costal margin and apex of fore wing broadly, and the whole surface of the hind wing irrorated with transverse, very slender, greenish strigæ and minute dots; these on the hind wing have a tendency to form subbasal, medial and discal obliquely transverse obscure bands; fore wing: the postdiscal black spot as on the upperside; terminal margins of both fore and hind wings with minute black, short, transverse slender lines at the apices of the veins, that have a tendency to coalesce and form a terminal continuous line as on the upperside. Antennæ dark brown spotted with white, head slightly brownish, thorax and abdomen white.—♀. Similar, the black markings on the upperside of the fore wing on the whole slightly broader, but not invariably so.

Exp. ♂ ♀ 25–53 mm. (1·00–2·10″).

Hab. The lower ranges of the Himalayas from Mussoorie to Sikhim; Central, Western, and Southern India, but not in the desert-tracts; Ceylon; Assam; Burma and Tenasserim; extending to China and the Malayan Subregion.

Larva. "Green, with a pale glaucous tinge about the bases of the legs and slightly hairy. Feeds on capers."

Pupa. "Sometimes green, but oftener of a delicate pink shade. Both the larva and pupa are very like those of *Terias hecabe*, but more delicately formed." (*Davidson, Bell & Aitken.*)

Mr. Moore has separated the Nicobar specimens under the name *nicobarica*, but in a long series from nearly all parts of its range I have found the characters relied upon for distinction eminently variable.

Genus **DELIAS.**

Delias, *Hübner, Verz. bek. Schmett.* 1816, p. 91; *Moore, Lep. Ind.* vi, 1904, p. 163.
Pieris, pt., *Doubleday & Hewitson, Gen. Di. Lep.* i, 1847, p. 44.
Thyca, pt., *Wallengren, K. Vet.-Ak. Förh.* xv, 1858, p. 76.
Piccarda, *Grote, Proc. Am. Phil. Soc.* xxxix, 1900, p. 32; *Moore, Lep. Ind.* vi, 1904, p. 175.

Type, *D. egialea*, Cramer, from Java.

Range. Indo-Malayan and Australian Regions.

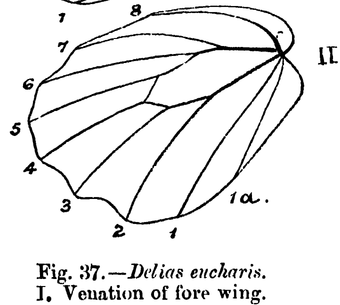

Fig. 37.—*Delias eucharis.*
I. Venation of fore wing.
II. Ditto of hind wing.

♂ ♀. Fore wing: costa nearly straight, very slightly arched; apex very broadly rounded; termen oblique; tornus obtusely rounded; dorsum straight, from slightly over the half to two-thirds the length of the costa; cell about half length of wing; upper discocellular absent, middle oblique, shorter than the lower, lower slightly concave; vein 6 shifted up, given off 7 beyond apex of cell: veins 8 and 9 absent; vein 10 out of 7 considerably beyond apex of cell, vein 11 from upper third of subcostal. Hind wing—cell: a regular oval slightly over half length of wing; vein 7 closer to 6 than to 8, vein 8 strongly curved. Antennæ about half length of fore wing, slender, with a gradual but well marked club; eyes naked; palpi short, subporrect; abdomen moderately long.

Key to the forms of Delias.[*]

A. Hind wing underside: with either basal or terminal red markings.
a. Hind wing underside: these red markings terminal.
a'. These red markings inwardly margined with black.
a². Hind wing upperside: with a transverse curved postdiscal black band .... *D. eucharis*, p. 141.
b². Hind wing upperside: without any transverse black band .... *D. hierta*, race *metarete*, p. 143.
b'. The red markings not margined inwardly with black.
a². Upperside: ♂, black margins to veins broad; ♀, interspaces on fore wing beyond postdiscal oblique black band not tinged with yellow .... *D. hierta*, p. 142.
b². Upperside: ♂, black margins to veins narrow; ♀, interspaces on fore wing beyond postdiscal oblique black band decidedly tinged with yellow .... *D. hierta*, race *ethire*, p. 143.
b. Hind wing underside: red markings basal.
a'. Red markings restricted to whole of interspace 8 .... *D. descombesi*, [p. 144.
b'. Red markings arranged so as to form a patch transversely across base of wing.
a². Hind wing upperside: basal area dusky, red markings seen through only by transparency from underside .... *D. aglaia*, p. 145.
b². Hind wing upperside; basal area red .. *D. thysbe*, p. 146.
B. Hind wing underside: without basal or terminal red markings.
a. Hind wing underside: ground-colour uniform yellow.
a'. Fore wing upperside: ♂, apex broadly shaded with black, with a clearly defined superposed transverse series of white spots; ♀, entirely shaded with dusky black scales; transverse series of white spots as in ♂ .... *D. agostina*, p. 147.
b'. Fore wing upperside: ♂, apical third to half shaded with black; transverse series of superposed spots not clearly defined, blurred; ♀, less densely shaded with dusky black scales; transverse series of white spots not well defined.................. *D. agostina*, race *agoranis*, p. 148.

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[*] *D. thysbe*, race *kandha*, is not included in this key, as that form is unknown to me.

b. Hind wing underside: ground-colour white to deep dusky brown.
  a'. Hind wing upperside: dorsal margin broadly greyish, its apical half yellow.
    a^2. Upperside ground-colour dusky brownish black to deep black.................. *D. belladonna*, [p. 148.
    b^2. Upperside ground-colour white shaded more or less with black scales .... *D. belladonna*, var. *flavalba*, p. 149.
  b'. Hind wing upperside: dorsal margin less broadly greyish, its apical half without any tinge of yellow .... *D. belladonna*, var. *ithiela*, p. 149.

571. **Delias eucharis** (Pl. XVII, fig. 109), *Drury* (Papilio), *Ill. Ex. Ent.* ii, 1773, p. 16, pl. 10, figs. 5, 6, ♂; *Moore, Lep. Ceyl.* i, 1881, p. 140, pl. 54, figs. 1, 1 *a*, 1 *b*, ♂ ♀, larva & pupa; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 358; *id. t. c.* 1896, p. 569; *Mackinnon, Jour. Bomb. N. H. Soc.* xi, 1898, p. 586; *Moore* (Piccarda), *Lep. Ind.* vi, 1904, p. 175, pl. 534, figs. 1, 1 *a*-1 *d*, larva & pupa, ♂ ♀.

♂. *Upperside*: white. Fore wing: the veins broadly black, this colour broadened triangularly at the termination of the veins, costal margin narrowly black; a broad black postdiscal transverse band from costa to dorsum sloped obliquely outwards from costa to vein 4, thence parallel to termen. Hind wing with the veins similar but for three-fourths of their length much more narrowly black; a postdiscal transverse black band as on the fore wing but much narrower, curved and extended only between veins 2 and 6; beyond this the veins are more broadly black and this colour as on the fore wing broadens out triangularly at the termination of the veins; the interspaces beyond the postdiscal black band pink, due to the vermilion coloration of the underside showing through. *Underside*: fore wing similar but the black edging to the veins much broader, the upper two interspaces beyond the postdiscal transverse band tinged with yellow. Hind wing: ground-colour bright yellow, the veins and transverse postdiscal band as on the upperside but much more broadly black, the latter extended from the costa to vein 2; the interspaces between the veins beyond the postdiscal fascia with a series of broadly lanceolate or cone-shaped vermilion-red spots, each spot very narrowly edged with white; the basal portion of interspace 6 white, in contrast to the bright yellow of the ground-colour. Antennæ black; head, thorax and abdomen white, the apical joint of the palpi black; the head and thorax with a mixture of black hairs that gives these parts a grey-blue appearance.—♀. *Upper* and *under sides* similar to those in the ♂, but the black edging to the veins and the post-discal transverse bands on both fore and hind wings very much broader.

Exp. ♂ ♀ 80–85 mm. (3·18 3·35").

Hab. The Himalayas up to 7000 feet; the whole of continental India except the desert tracts; Ceylon.

Larva. "Long, cylindrical and smooth with an oily gloss. Two subdorsal rows of long white bristles springing from minute white tubercles; head, sides and back sparsely clothed with short white bristles: colour brown, head and feet black. It may be found from the beginning of August everywhere on the common 'mistletoe' (*Loranthus*), from which it will drop and hang by a thread if the tree is shaken. We have never found it feeding on anything else. Unlike most butterflies this species lays as many as twenty or thirty eggs on one leaf, in parallel rows, with equal intervals, and the larvæ continue in some measure gregarious to the last, so that a large number of pupæ are often found, at a little distance from each other, on a wall, or the trunk of a tree."

Pupa. "Closely attached by the tail and by a band generally to a vertical surface with the head upwards. It is moderately stout with a short snout, two small tubercles on the head, a sharp but not prominent dorsal ridge on the thorax, continued in a row of tubercles on the abdominal segments. Below these are two partial subdorsal rows. Colour bright yellow; tubercles and a row of spots defining the wing-cases black.

"Large numbers are destroyed by a dipterous parasite very like a common house-fly." (*Davidson & Aitken.*)

572. **Delias hierta** (Pl. XVII, fig. 110), *Hübner* (Pontia), *Zuträge Exot. Schmett.* i, 1818, p. 17, figs. 77, 78, ♂; *Druce, P. Z. S.* 1874, p. 108; *Moore* (Piccarda), *Lep. Ind.* vi, 1905, p. 178, pl. 532, figs. 2, 2 *a*–2*c*, ♂ ♀, & pl. 533, figs. 1, 1*a*–1*c*, ♂ ♀.
Thyca devaca, *Moore, P. Z. S.* 1872, p. 566 ♀.
Delias indica, *Moore, P. Z. S.* 1878, p. 839.

Race metarete.

Delias metarete, *Butler, Trans. Linn. Soc.* 1879, p. 550; *Moore* (Piccarda), *Lep. Ind.* vi, 1905, p. 181, pl. 533, figs. 2, 2*a* 2*c*, ♂ ♀.

Race ethire.

Delias ethire, *Doherty, J. A. S. B.* 1886, p. 262, ♂ ♀; *Moore* (Piccarda), *Lep. Ind.* vi, 1905, p. 180.

♂ ♀. Closely resembles *D. eucharis* but can be distinguished as follows:—♂. *Upperside*, fore wing: the black margins to the veins more diffuse; the transverse postdiscal fascia diffuse, ill-defined, oblique, not parallel to termen in its lower portion but terminated at apex of vein 2; the apical portion of the wing beyond the fascia more or less so thickly shaded with black scales as to leave the white lanceolate spaces between the veins (so prominent in *eucharis*) ill-defined and obscure. Hind wing white, the black venation and terminal narrow black border as well as the subterminal vermilion-red spots between the veins on the underside show through by transparency. *Underside*: fore wing as in *eucharis*, but the black margins to the veins much broader and the postdiscal transverse fascia as on the upperside oblique but broader. Hind wing differs from that of *eucharis* in the much deeper chrome-yellow tint of the ground-colour, the postdiscal black curved fascia that in *eucharis* separates the yellow from the subterminal vermilion-red spots entirely wanting, the red spots themselves pointed inwardly, not subcordate, they conspicuously increase in size posteriorly. Antennæ, head, thorax and abdomen similar to those of *eucharis.*—♀ differs from the ♀ of *eucharis* on the upperside by the very much darker shading, especially on the fore wing, and by the postdiscal transverse band which is as in the ♂ oblique but broader. Hind wing also more darkly shaded, the postdiscal transverse curved black band entirely absent. *Underside* as in the ♂ but darker, the fore wing especially more thickly shaded with black scaling, the preapical interspaces tinged with yellow. Antennæ, thorax and abdomen similar to those in *eucharis.*

Exp. ♂ ♀ 78-84 mm. (3·08-3·30″).

Hab. The Himalayas from Kumaon to Sikhim in the low hot valleys; Bengal; Calcutta (*de Nicéville*); Assam; Burma to Northern Tenasserim; extending to Siam.

Specimens from the Himalayas and Assam are paler than Burmese specimens and have the yellow on the underside of the hind wing often restricted to the base and to the posterior half of the wing.

Race **metarete**, Butler.—Differs from typical *hierta* as follows:—♂. *Upperside*: ground-colour a much purer white; apical half of fore wing in contrast with the white on basal half densely shaded with black scales. *Underside*: the colours clearer and purer, the chrome-yellow on the hind wing confined to the base and posterior half of the wing, the apical half of the cell and the anterior interspaces within the line of the vermilion-red spots pure white; the anterior two or three subterminal red spots margined interiorly with diffuse black scaling.—♀ differs less from the ♀ of *hierta*, but on the underside of the hind wing the yellow colour is as restricted as it is in the ♂; the subterminal red spots are of a richer vermilion than in *hierta*, and the anterior two or three as in the ♂ have an interior narrow margin of diffuse black scales. Antennæ, head, thorax and abdomen as in *hierta*, but the thorax and abdomen shaded slightly darker with a bluish-grey appearance.

Exp. ♂ ♀ 76-88 mm. (3·02-3·48″).

Hab. Southern Tenasserim; extending to Malacca and Sumatra.

Race **ethire**, Doherty.—♂ ♀. Differs from typical *hierta* as follows:—♂. *Upperside*: very pure white. Fore wing: the black margins to the veins very narrow, the oblique postdiscal band ill-defined, scarcely any irroration of black scales on the apical half of the wing. Hind wing pure white, the colours of the underside seen through by transparency as in *hierta*. *Underside*: differs from *hierta* principally in the brighter tint of the yellow on the hind wing, and in the more clearly defined, less diffuse black margins of the veins.—♀. Differs less from ♀ *hierta* than does the ♂ from the corresponding sex of the same insect. *Upperside*: the interspaces beyond the postdiscal oblique band on fore wing and the cell and basal halves of the interspaces beyond the cell on the hind wing distinctly tinged with yellow. *Underside*: all the markings more neatly and clearly defined than in *hierta*, the interspaces beyond the oblique postdiscal band on the fore wing bright lemon-yellow. Antennæ, head, thorax and abdomen in both sexes as in *D. hierta*.

Exp. ♂ ♀ 66–84 mm. (2·60–3·30″).

Hab. Madras; Orissa; Lower Bengal.

There is a single specimen in the British Museum labelled "Khasia Hills"?

573. **Delias descombesi** (Pl. XVII, fig. 111), *Boisduval* (Pieris), *Spec. Gén. Lép.* i, 1836, p. 465; *Moore, P. Z. S.* 1878, p. 839; *Elwes, Trans. Ent. Soc.* 1888, p. 408; *Moore, Lep. Ind.* vi, 1905, p. 183, pl. 536, figs. 1, 1*a*–1*c*, ♂ ♀.

♂. *Upperside*: opaque white. Fore wing: costa and terminal margin very narrowly black; extreme base, apex broadly and termen submarginally more or less thickly irrorated with black scales, the width of this blackish border decreases posteriorly along the termen. Hind wing: termen narrowly black, the black markings of the underside show dusky bluish through transparency. *Underside*, fore wing: black; an obliquely placed short broad bar along the discocellulars and a subterminal series of outwardly pointed spots, of which the anterior three lengthen into streaks, white; the anterior and posterior margins of the cell and broad streaks, that do not reach the terminal margin, on each side of veins 1 to 4, grey. Hind wing: rich chrome-yellow; costa and termen broadly black; interspaces 2 to 7 with outwardly pointed, broadly triangular, yellowish-white diffuse spots on the black terminal margin, the black on the inner side of these spots produced conically inwards; the black in interspace 7 centred with an elongate, outwardly somewhat diffuse, oval vermilion streak.—♀. *Upperside*: black. Fore wing: a broad oblique apical cell-bar and a curved subterminal series of somewhat hastate spots, white. Hind wing: apical two-thirds of costa and the termen broadly black, the rest of the wing yellowish white sparsely irrorated with black scales; the vermilion streak in interspace 8 on the underside shows through by transparency, and the broad terminal black border has a subterminal very obscurely marked series of whitish spots. *Underside*: fore wing as in the ♂ but the grey bordering restricted to very narrow streaks along the median vein and veins 2 to 4. Hind wing: differs from that of the ♂ as follows:—the rich chrome-yellow replaced by dull white touched with yellow along the dorsal margin and in the cell and lightly irrorated in cell and interspaces with black scales, the inner margin of the black terminal border produced in the interspaces into more elongate cones. In both sexes: antennæ black, head, thorax and abdomen above greyish; beneath: white.

Exp. ♂ ♀ 83–90 mm. (3·28–3·53″).

Hab. Sikhim; Bhutan; Assam; Burma: Tenasserim; extending to Siam, Cochin-China and the Malay Peninsula.

574. **Delias aglaia,** *Linn.* (Papilio) *Syst. Nat.* ed. x, i, 1758, p. 465; *Moore, Lep. Ind.* vi, 1904, p. 169, pl. 531, figs. 1, 1*a*–1*d*, ♂ ♀, larva & pupa.

Delias pasithoe, *Linn.* (Papilio) *Syst. Nat.* ed. xii, 1767, p. 755 *Elwes, Trans. Ent. Soc.* 1888, p. 407; *Watson, Jour. Bomb. N. H. Soc.* iv, 1888, p. 25.

♂. *Upperside*: black. Fore wing with more or less distinct, somewhat diffuse, broad streaks from base, in the discoidal cell and interspaces 1 and 2, the streak in the last the most produced; a white oval spot at lower apex of cell traversed by the lower discocellular, followed by a subterminal series of greyish-white hastate markings with their points turned inwards, the markings opposite the apex of the wing elongate and shifted a little inwards. Hind wing: a broad subbasal transverse greyish-white band merged posteriorly in a large bright yellow dorsal patch that fills the apical two-thirds, the extreme apex excepted, of interspaces 1*a*, 1, and of 2; a white transversely elongate spot along the middle discocellular, and beyond it a postdiscal curved series of greyish-white elongate hastate spots in interspaces 3 to 7. *Underside*: black. Fore wing: somewhat elongate greyish-white markings in interspaces 1, 2, 3 and in cell, formed into a conspicuous oblique broad bar across the middle of the wing; a white spot at lower apex of cell and a postdiscal series of hastate spots as on the upperside. Hind wing: black, a rich dark crimson patch at base, a yellow dorsal patch as on the upperside but darker; the apical two-thirds of the cell, three spots above it and one below at bases of interspaces 3, 6 and 7 respectively and a curved discal series of elongate spots beyond apex of cell, rich chrome-yellow; of these latter spots the spot in interspace 5 is much the longest. Antennæ, head, thorax and abdomen above black, abdomen on the sides and below grey.—♀. *Upperside*: brownish black. Fore wing: markings as in the ♂, but the cellular streak and the streaks in interspaces 1 and 2 below the cell short and formed into a broken oblique broad greyish-white band across the wing. Hind wing: markings similar to those in the male, but the basal crimson patch of the underside seen through by transparency, the transverse broad subbasal band and dorsal patch both pale yellow and much broader than in the ♂, and the postdiscal curved series of hastate spots obscure and ill-defined. Antennæ, head, thorax and abdomen as in the ♂, the abdomen whitish grey below and on the sides.

Exp. ♂ ♀ 66–90 mm. (2·60–3·55″).

Hab. Nepal; Sikhim; Assam; Burma; Tenasserim; to the south extending through the Malay Peninsula to Borneo; to the east through the Shan States to Siam and S. China.

Larva. Brownish red, each segment with a transverse row of long bristles, the outer bristles black, the middle yellow. Length about 2 inches. Found in March feeding on the young leaves of the *binga* (*Nauclea rotundifolia*).

Pupa. Very dark reddish brown or black, smooth, sinuate; head with three sharp points and a broad truncation in front; segments of the abdomen and the front with small acute tubercular projections.

575. **Delias thysbe** (Pl. XVIII, fig. 117), *Cramer* (Papilio), *Pap. Exot.* iii, 1782, p. 70, pl. 233, fig. C ♀; *Moore, Lep. Ind.* vi, 1904, p. 171, pl. 532, figs. 1, 1*a*–1*c*, ♂ ♀.
Thyca pyramus, *Wallace, Trans. Ent. Soc.* 1867, p. 347; *Elwes* (Delias), *Trans. Ent. Soc.* 1888, p. 407.

Race kandha.

Deliaskandha, *Doherty, J. A. S. Beng.* 1886, p. 262; *Moore, Lep. Ind.* vi, 1904, p. 173.

♂ ♀. Resembles *D. aglaia* in both sexes; the differences, however, are as follows:—*Upperside,* fore wing: the white spot at apex of cell replaced by an upper and a lower grey scaled spot that crosses the discocellulars, which are black; the postdiscal series of hastate spots converted into broad greyish diffuse streaks of which the streak in interspace 3 is shifted more inward than the others. In the ♂ the broad subbasal greyish streaks in interspaces 1 and 2 and in the cell are longer than in the ♀. Hind wing black: basal area to middle of cell deep vermilion, traversed by the black veins; interspaces 1*a*, 1 and posterior medial portion of 2 powdered thickly with greyish-white scales in the ♂; remainder of interspace 2 bright yellow; interspaces 3 to 8 with broad diffuse grey streaks that do not reach the termen, the streaks in interspace 5 extend into apex of cell; in ♀ similar, but interspaces 2 to 5 with still broader yellow streaks, of which those in interspaces 4 and 5 cross over the discocellulars into the apex of the cell. *Underside*: similar to the upperside, the grey markings paler, almost white; hind wing in both sexes with the basal vermilion patch extended to the base of the dorsal margin: humeral angle at base of wing with an ochraceous spot; apex of cell and broad streaks in interspaces 1 to 8 yellow fading to yellowish-white anteriorly; the veins narrowly black, which colour broadens triangularly at their apices and so forms anteriorly a more or less irregular terminal black margin. Antennæ, head, thorax and abdomen as in *D. aglaia.*

Exp. ♂ ♀ 78–92 mm. (3·1–3·6″).

Hab. Nepal; Sikhim; Bhutan; Assam; Burma: Tenasserim; extending to Siam and the Malay Peninsula.

Race **kandha,** Doherty.—"Allied to *D. pyramus,* Wall. (= *D. thysbe*) from Sikhim. In *kandha* the ochreous anal area of the hind wing is replaced by pale cream; the light discal areas on the hind wing below, which in *pyramus* are ochreous anally and whitish apically, are, in *kandha*, of an almost uniform bright yellow hue, inclining to lemon; the ochre spot at the base of the hind wing below is much larger and more distinct; the apical grey streaks of the fore wing above are obscurely tinged with ochreous. All the pale marks are larger, and the black areas smaller and better defined. The female hardly differs from the male.

"*Exp.* 98 mm.

"*Hab.* Madras, Vizagapatam." (*Doherty.*)

Unknown to me.

576. **Delias agostina** (Pl. XVII, fig. 112), *Hewitson* (Pieris), *Exot. Butt.* i, *Pieridæ*, 1852, pl. 1, figs. 1, 2, ♂; *Elwes*, *Trans. Ent. Soc.* 1888, p. 408; *Moore* (Piccarda), *Lep. Ind.* vi, 1905, p. 181, pl. 535, figs. 1, 1 *a*–1 *c*, ♂ ♀.

Race agoranis.

Delias agoranis, *Grose-Smith*, *A. M. N. H.* (5) xx, 1887, p. 226; *Moore* (Piccarda), *Lep. Ind.* vi, 1905, p. 182, pl. 535, figs. 2, 2 *a*, ♂.

♂. *Upperside*: white. Fore wing: costa narrowly, apex broadly shaded with black, the shading so arranged as to leave on the latter a conspicuous curved series of oval outwardly-pointed spots of the ground-colour, that increase in size from the spot in interspace 3 to the spot in interspace 6, the subcostal spot above small again; the black shading on the apex is continued slightly inwards along the veins, while its width varies somewhat in different specimens. Hind wing uniform, unmarked, or with the merest trace of black scaling that forms spots along the terminal margin; the colour of the underside seen through by transparency gives a pink tinge to the basal and dorsal areas and a faint bluish tint to the terminal margin. *Underside*: fore wing white, the costa more broadly black than on the upperside, the whole of the veins bordered broadly with black; a subapical curved broad bar from costa to vein 2, black. Hind wing bright canary-yellow, costa narrowly white; terminal margin with an even moderately broad border, dusky black, and with a superposed series of irregular white lunular marks.—♀. *Upperside*: fore wing entirely shaded with black, sometimes very dark, almost completely black (wet-season form?), the curved preapical series of white spots as in the ♂. Hind wing: sometimes canary-yellow, sometimes white with a pink tinge from the colour of the underside showing through; terminal margin more or less broadly black, with a marginal series of white spots in the interspaces. *Underside*: as in the ♂, but the white spots on the terminal black border of the hind wing larger. Antennæ in both sexes black; head, thorax and abdomen white shaded with fuscous black.

Exp. ♂ ♀ 66–70 mm. (2·6–2·76").

Hab. Eastern Himalayas; Nepal; Sikhim; Assam; Burma; Tenasserim, extending to Siam.

Race **agoranis**, Grose-Smith.—Differs from typical *agostina* as follows:—♂. *Upperside*, fore wing: apical third to nearly apical half shaded with diffuse black scaling; the curved series of spots of the white ground-colour so conspicuous in *agostina* present, but more or less blurred. Hind wing: terminal margin with very diffuse dusky-black spots at the apices of the veins. *Underside*, fore wing: the black edgings to the veins very diffuse. Hind wing a much paler yellow than in typical *agostina*; the terminal dusky-black border as in the typical form but broader, the black scaling more diffuse.—♀. *Upperside*: very similar to ♀ *agostina*, but the dusky-black colouring on both fore and hind wings less pronounced; the cell and greater part basally of the interspaces with the white of the ground-colour more conspicuous. *Underside*: as in *agostina*, but the yellow on the hind wing paler, the dusky-black terminal border broader, inwardly not well-defined, the superposed white spots blurred with black scaling and diffusely spread inwards. Antennæ, head, thorax and abdomen as in typical *agostina*.

Exp. ♂ ♀ 78-81 mm. (3·08-3·19″).

Hab. South Tenasserim.

This form is the connecting-link between *D. agostina*, Hewitson, and *D. singhapura*, Wallace.

577. **Delias belladonna**, *Fabr.* (Papilio) *Ent. Syst.* iii, 1793, p. 180; *Donovan* (Papilio), *Nat. Rep.* i, 1823, pl. 35 ♀; *Elwes, P. Z. S.* 1882, p. 401; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 585, pl. 5, fig. 19.

Pieris horsfieldii, *Gray, Zool. Misc.* 1831, p. 32; *Moore* (Delias), *Lep. Ind.* vi, 1904, p. 166, pl. 529, figs. 1, 1 *a*–1 *c* & 2, 2 *a*, ♂ ♀.

Pieris sanaca, *Moore, P. Z. S.* 1857, p. 103, pl. 44, fig. 4 (*by error 6 above fig. on plate*); *id.* (Delias) *Lep. Ind.* vi, 1904, p. 163, pl. 528, figs. 1, 1 *a*–1 *e*, ♂ ♀.

Thyca ithiela, *Butler, A. M. N. H.* (4) iv, 1869, p. 242: *Moore* (Delias), *Lep. Ind.* vi, 1904, p. 167, pl. 530, figs. 1, 1 *a*–1 *c*, ♂ ♀.

Thyca berinda, *Moore, P. Z. S.* 1872, p. 566, ♀.

Delias flavalba, *Marshall, P. Z. S.* 1882, p. 759.

♂. *Upperside*: dusky brownish black to black. Fore wing with the following diffuse white markings:—Cell with an oblique subapical bar, an angulated discal series of three upper spots inclined obliquely outwards and three lower spots inclined obliquely inwards; in most specimens the oblique bar in the cell and the lower two of the discal series of spots are extended diffusely inwards; finally, a subterminal series of large rounded spots white inwardly, irrorated with black scales outwardly. Hind wing: dorsal margin, including interspaces 1 *a*, 1 and 2, basal half whitish, apical half more or less strongly tinged with pure canary-yellow; a large oval yellow spot at base of interspaces 7 and 8; a broad, ill-defined diffuse whitish streak in cell; a discal series of diffuse whitish spots that is angulated outwards at interspace 5, the posterior spots more or less tinged with yellow; followed by a subterminal series of whitish spots as on the fore wing, only slightly tinged with yellow. *Underside*: ground-colour similar but more brownish, markings similar but more clearly and sharply defined; the subterminal series of spots on both fore and hind wings more or less dentate; the upper three spots of this series on the fore wing and generally all of the spots on the hind wing yellow; on the hind wing the dorsal margin and the cell-streak are also yellow, while the discal series of spots are more often than not tinged with the same colour. Antennæ, head, thorax and abdomen black, the antennæ annulated obscurely with white, the abdomen beneath white.— ♀. Similar, ground-colour always paler and duller: markings on the upperside less distinct, the subterminal series of spots on the fore wing as a rule farther from the margin than in the ♂.

Exp. ♂ ♀ 70-98 mm. (2·78-3·85").

Hab. The Himalayas from Kulu to Sikhim; Bhutan from 2000 to 7000 feet; Assam: the Khasia Hills; the hills of Burma and Tenasserim; extending into Siam and China.

Var. *flavalba*, Marshall, is a very pale variety of this form described originally from Kunawur. Gradations between it and typical *belladonna* are formed by *D. sanaca*, Moore, *D. hearsayi*, Butler, and *D. chrysorrhœa*, Vollenhoven. Typical *flavalba* differs from *belladonna* as follows:—*Upperside*: white, more or less irrorated, especially on the outer half of the fore wing, with black scales. Fore wing: the veins all broadly but diffusely bordered with black on both sides; in some specimens this black bordering to the outer vein coalesces to form a sort of ill-defined postdiscal transverse band, and in all specimens it is most prominent along the discocellulars. Hind wing: white, a subcostal yellow spot at base as in typical *belladonna*; the veins along the dorsal margin at base, the median vein, and the discocellulars broadly bordered with black; an ill-defined very faint subterminal series of black lunules; the apices of interspaces 1 *a*, 1 and 2 pale yellow. *Underside*: fore and hind wings similar to the upperside, but the hind wing with the following additional markings:—a broad elongate spot or streak in cell, a basal subcostal spot, a discal very curved series of spots, and a subterminal series of spots, all pale yellow.

Occasionally, both in the typical and in the pale forms, the subcostal basal spot on the hind wings is orange-red. The pale forms seem to occur only in the N.W. Himalayas, but the typical form also occurs there, the two flying together with other specimens showing all gradations between them.

Var. *ithiela*, Butler, is the very dark Eastern form with smaller markings and with the interspaces 1 *a*, 1 and 2 of the hind wing entirely lacking the yellow on the apical half.

Genus **PRIONERIS.**

Prioneris, *Wallace, Trans. Ent. Soc.* 1867, p. 383; *Butler, Cist. Ent.* i, 1870, p. 39, pl. 1, fig. 1, venation; *Moore, Lep. Ceyl.* i, 1881, p. 140; *id. Lep. Ind.* vi, 1905, p. 186.

Type, *P. thestylis*, Doubleday, from N.E. India.

Range. Indo-Malayan Region; China.

♂ ♀. Fore wing: costa widely arched, strongly serrated in ♂; apex produced, subacute; termen oblique, slightly concave in the middle towards tornus, which latter is rounded; dorsum comparatively short, only about two-thirds length of the costa; cell slightly longer than half the length of the wing; vein 6 out of lower side of 7 well beyond apex of cell, upper discocellular therefore absent; middle discocellular very oblique, lower slightly less oblique and shorter than middle; vein 8 absent; vein 9 from within apical third of 7; veins 10 and 11 free, emitted and extended close together from just beyond middle of subcostal vein. Hind wing more or less pyriform; costa nearly straight from base to near apex, then strongly arched, the arch continued along the termen to the tornus; tornus rounded, not well-marked; dorsum widely arched; cell long, placed in the middle of the wing, the area above it to the costa very broad; discocellulars very long, outwardly oblique, lower apex acute; precostal spur or vein outwardly curved. Antennæ long, slender, slightly more than half length of fore wing; club long and very gradual; palpi subporrect, thickly fringed with long stiff hairs anteriorly, third joint short, slightly clavate, scaled; head above with a tuft of long hairs; eyes large, prominent, naked; thorax and abdomen moderately stout.

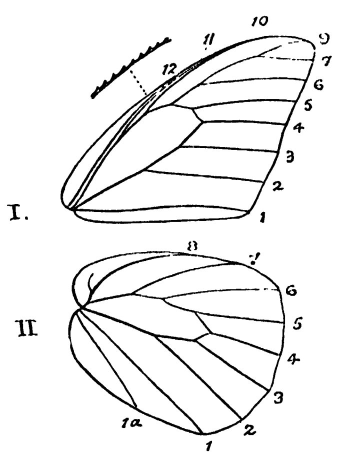

Fig. 38.
Prioneris thestylis, venation.
I. Fore wing.
II. Hind wing.

Key to the forms of Prioneris.

a. Underside hind wing with no basal red patch.
  a'. Underside hind wing with no terminal series of red spots .... *P. thestylis*, p. 151.
  b'. Underside hind wing with a terminal series of red spots .... *P. sita*, p. 154.
b. Underside hind wing with a basal red patch.. *P. clemanthe*, p. 158.

578. **Prioneris thestylis** (Pl. XVII, fig. 113), *Doubleday* (Pieris), *in Gray's Zool. Misc.* 1842, p. 76; *Doubleday, Westw. & Hewits.* (Pieris) *Gen. Di. Lep.* i, 1847, p. 44, pl. 6, fig. 2 ♂; *Wallace, Trans. Ent. Soc.* 1867, p. 384; *Elwes, Trans. Ent. Soc.* 1888, p. 410.
Pieris seta, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 78.
Prioneris watsoni, *Hewitson, Trans. Ent. Soc.* 1868, p. 99; *Moore, P. Z. S.* 1878, p. 839.

Wet-season form.—♂. *Upperside*: white. Fore wing: veins black, the white ground-colour between the veins darkened on the basal area by the markings of the underside that show through; costa and apical third or more of the wing black, this colour extended into the cell at its apex and gradually decreasing in width to the tornus; on the apical third the black is not uniform, but variegated with markings of the white ground-colour as follows:—a series of streaks in interspaces 3 to 7 and 9, broadly interrupted in interspaces 3, 4, and 5 and form a discal and a subterminal series, continuous in interspaces 6, 7, and 9, and pointed at apex; in interspaces 1 *a*, 1, and 2 the white ground-colour extends almost to the terminal margin, but is limited at their apices by the broadening of the black at the apices of the veins, sometimes in interspaces 1 and 2 the white is also indistinctly interrupted by a diffuse transverse scaling of black. Hind wing: veins black on the outer two-thirds, with broad black terminations at their apices, these are so connected as to form a black terminal edging to the wing; within this the ground-colour is darkened by the markings of the underside that show through. *Underside* fore wing: black, variegated with the following white and yellow markings:—interspaces 1 *a*, 1, and 2 white, limited by the black at the apices of the veins and occasionally subterminally by an indistinct diffuse transverse black bar as on the upperside; cell with ill-defined, often largely interrupted white streaks in the lower half and two oval white spots before the apex in the upper half; an anterior discal series of five spots, the posterior three white, the anterior two bright chrome-yellow; the subcostal spot elongated into a streak is followed by a transverse subterminal series of spots, the anterior three or four bright chrome-yellow, the posterior two or three white, the upper two elongate. Hind wing: black, with the following bright chrome-yellow markings:—interspaces 1 *a* and 1 with broad streaks, limited at base and more narrowly at apex: a broad, somewhat irregular streak margined with white in cell, a strongly-curved discal series of large spots margined with white and decreasing in size anteriorly in interspaces 1 to 7, followed by a subterminal series of much smaller spots in interspaces 2 to 7, the upper two or three elongate; finally an oval spot interior to the discal spot in interspace 7 and a large spot on the precostal area conspicuously traversed by the black precostal spur or vein. Antennæ black; head and thorax clothed with long bluish-grey pile; abdomen blackish; beneath: the palpi, head and thorax black, abdomen white.

♀. *Upperside*: deep brownish black, with the following white markings in addition to a broad sullied white streak that is suffused with yellow at its apex and fills the basal three-fourths of interspaces 1 *a* and 1 on hind wing:—Fore wing: a slender streak near base of cell, four spots at apex, the anterior three placed obliquely; two slender somewhat curved streaks from near base of interspace 1, with a series of elongate discal spots in the interspaces 2 to 6, followed by a subterminal series of elongate spots or short narrow streaks in interspaces 1 to 7, the streak in interspace 1 double; finally, a pretornal short streak on the dorsum and a large subcostal spot produced outwards as an obscure slender streak in interspace 9. Hind wing: a streak in cell with a discal series of spots beyond, followed by a subterminal series of spots. *Underside*: black, this colour of a deeper tint on the hind wing; markings as on the upperside, but all the spots and streaks larger, broader, more clearly defined; the anterior two or three subterminal markings on the fore wing and all the markings including the broad stripes in interspaces 1, 1 *a* on the hind wing, rich chrome-yellow. Antennæ, head, thorax and abdomen black, thorax above clothed with long dusky greenish-grey hairs.

Dry-season brood.—♂ differs from the ♂ wet-season brood as follows:—*Upperside*, fore wing: the black at apex and along the veins more restricted. Hind wing: uniform white flushed with yellow, the veins not edged with black towards their apices, terminal margin with a very slender black line. *Underside*: on both fore and hind wings the black much more restricted, on the fore wing it enters the cell only anteriorly and is confined to the apex and to a narrow edging along veins 3, 4 and 5; on the hind wing only an edging to the median vein posteriorly, bases of veins 1 *a* and 1, an edging to vein 7, the greater part of interspace 7 and dilated edgings at the terminal end of each vein, are black; the rest is yellow, the veins on outer half of the wing narrowly white-bordered. Antennæ, head, thorax and abdomen as in the wet-season form.—♀ very similar to ♀ of wet-season brood; differs as follows:—*Upperside* hind wing: the white streak in cell broader, below the cell a large patch of chrome-yellow that occupies the dorsal and pretornal areas but does not extend above vein 3; the discal white spots in interspaces 4, 5 and 6 much larger. *Underside*: as in the wet-season form, but the ground-colour of the fore and hind wings alike—a dull sepia-black; the markings similar to those in the wet-season form, but the yellow in interspaces 1 *a*, 1, 2 and 3 of the hind wing more extensive, in the latter three the interspaces are edged with white. Antennæ, head, thorax and abdomen as in the wet-season form.

Exp. ♂ ♀ 75–102 mm. (2·96–4·02″).

Hab. Himalayas; Mussoorie; Sikhim; Bhutan; Assam; Burma; Tenasserim; the Shan States; extending to Siam. Mr. Mackinnon informs me that General Buckley discovered it at Mussoorie. It probably extends all along the Himalayas from Sikhim to Mussoorie.

579. **Prioneris clemanthe,** *Doubleday* (Pieris), *A. M. N. H.* 1846, p. 23; *Wallace, Trans. Ent. Soc.* 1867, p. 385, ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 411; *Moore, Lep. Ind.* vi, 1905, p. 191, pl. 537, figs. 1, 1 *a*–1*f*, ♂ ♀.

♂. *Upperside*: white. Fore wing: veins black, edged broadly with the same colour towards the terminal margin, the black continuous along the actual margin, in the interspaces above vein 3 it is densely irrorated with black scales and leaves mere narrow streaks of the white ground-colour apparent; costa black. Hind wing: the yellow ground-colour of the underside partially visible through transparency; veins 7 and 8 black, the rest black only towards their apices; finally, a black terminal slender line. *Underside*: fore wing white, the veins broadly edged with black, this colour dilated broadly along the discocellulars, along the basal halves of veins 3 to 7, along the costa, the apex of the wing and at the ends of all the veins. Hind wing: yellow, precostal area vermilion-red, all the veins jet-black and prominent; a subterminal comparatively broad band from apex of vein 3 to apex of vein 7 white, narrowed posteriorly; beyond it a narrow terminal edging of black. Antennæ and head black, thorax clothed with long bluish-grey hairs, abdomen white; beneath: the palpi and thorax dusky-black, abdomen white.—♀. *Upperside*: as in the ♂, but on the fore wing the black edging to the veins greatly increased and the ground-colour limited further by a very dense irroration of black scales, which gives a dusky-grey appearance to so much of the white as is visible; thus the wing looks all black, with a series of very diffusely-defined greyish streaks in the cell and interspaces beyond, which streaks, however, do not attain the extreme margin and are, moreover, more or less medially interrupted by the black and form an obscure discal and a subterminal series. The whitest spots left are the elongate ones in the cell and in the anterior interspaces beyond and above it. Hind wing: the black terminal line in the ♂ replaced by a broad black terminal band traversed by a series of spots of the white ground-colour in the interspaces; these, however, are thickly overlaid by an irroration of black scales. *Underside*: fore wing similar to the upperside, but the streaks and spots of the ground-colour left apparent are not so densely overlaid with black scales. Hind wing as in the ♂, but the black edging to the veins very much broader; the subterminal band black, with an anterior series of large yellow spots, and divided from the yellow over the basal and discal areas by a curved subterminal narrow black band; the terminal spots, as in the ♂, do not reach below vein 2; in most specimens the one or two posterior spots are pale, inclining to buff or ochraceous white. Antennæ black; head, thorax and abdomen nearly black, much darker than in the ♂.

Exp. ♂ ♀ 82–90 mm. (3·24–3·56″).

Hab. Sikhim; Bhutan; Assam; Burma; Tenasserim; the Shan States; extending to Siam.

580. **Prioneris sita**, *Felder* (Pieris), *Novara Reise, Lep.* ii, 1865, p. 161, pl. 25, fig. 12 ♂; *Wallace, Trans. Ent. Soc.* 1867, p. 385; *Moore, Lep. Ceyl.* i, 1881, p. 141, pl. 54, fig. 2 ♂; *Davidson, Bell, & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 570; *de Nicéville, J. A. S. B.* 1890, p. 250.

♂. *Upperside*: white, with a slight glaucous or greenish tint. Fore and hind wings: the postdiscal markings of the underside seen through faintly by transparency; all the veins of the fore wing from base, and the veins of the hind wing on the outer third margined narrowly with black, that towards the terminal margin broadens, coalesces and forms a band on the extreme margin; on the fore wing this is comparatively broad and the black markings more or less triangular; at each vein on the hind wing the band is reduced to mere black lines, slightly broader anteriorly than posteriorly. *Underside*: fore wing white, costa black, apex suffused with yellow, all the veins from base broadly bordered with black that does not expand towards their apices; an ill-defined transverse, somewhat diffuse, postdiscal black band from veins 1 to 7. Hind wing: rich chrome-yellow up to a postdiscal black band, beyond which the ground-colour is white with a series of large terminal vermilion-red rectangular or truncated cone-shaped spots; veins from base bordered somewhat narrowly but conspicuously with black. Antennæ brownish black, head and thorax clothed with long bluish-grey hairs, abdomen glaucous white; beneath: the palpi and thorax greyish white, abdomen white.—♀. Very similar, the black edgings to the veins on fore and hind wings on both upper and under sides broader; on the upperside the veins of the hind wing as well as of the fore being black right up to the base. *Upperside*: fore and hind wings with a well-marked dusky-black postdiscal diffuse band; cell of fore wing traversed by three slender longitudinal black lines. *Underside*: the yellow and vermilion tints brighter than in the ♂.

Exp. ♂ ♀ 86-90 mm. (3·40-3·55″).

Hab. Southern India; Ceylon.

Larva. "Colour dull blue-green. Head and all the segments dotted with minute blue tubercles, those on the head and sides black-tipped; dorsal surface pubescent; a lateral fringe of soft white hairs below the spiracles. Feeds on *Capparis.*"

Pupa. "Bright green. Sharply pointed at the head, with two strong lateral points and keeled on dorsal surface of thoracic segments; an interrupted yellow dorsal line, and a short, curved crimson line on each side below thoracic segments bordering a small white irregular black-speckled spot." (*E. E. Green, MS. note as quoted by Moore.*)

Genus **ANAPHÆIS.**

Anaphæis, *Hübner, Verz. bek. Schmett.* 1816, p. 93.
Belenois, *Moore* (*nec Hübner*), *Lep. Ceyl.* i, 1881, p. 137.

Type, *A. creona*, Cramer, from Africa.

Range. Africa; Southern Asia; Australia.

♂ ♀. Fore wing: costa very slightly arched, nearly straight; apex slightly produced but more or less obtuse; termen slightly convex; tornus obtuse; dorsum sinuous; cell about half length of wing, vein 6 out of 7 about one-third from base of 7, upper discocellular therefore absent; middle and lower discocellulars oblique; vein 8 absent, 9 one-third from apex of 7, 10 free, 11 anastomosed with 12. Hind wing pear-shaped; cell slightly longer than half length of wing; precostal spur curved obliquely outwards. Antennæ about half length of wing; club broad, slightly flattened; palpi robust, subporrect, third joint short; eyes naked; legs slender, scaled, without long hairs; abdomen comparatively robust; claspers in ♂ long, narrow.

Key to the forms of Anaphæis.

A. ♂. Upperside fore wing: apical area black with enclosed well-defined elongate white spots; ♀, these spots more or less obsolescent. ♂ ♀. Underside hind wing: ground-colour more or less yellow or tinged with yellow .... *A. mesentina*, p. 155.

B. ♂. Upperside fore wing: as in ♀ of typical form; ♀ with apical area of fore wing entirely black. ♂ ♀. Underside hind wing: ground-colour a rich deep chrome-yellow .... *A. mesentina*, race *taprobana*, p. 157.

581. **Anaphæis mesentina**, *Cramer* (Papilio), *Pap. Exot.* iii, 1782, pl. 270, figs. A, B; *Kollar* (Pieris), *in Hügel's Kaschmir*, iv, 1844, p. 409; *Moore* (Pieris), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 72, pl. 12, figs. 9, 9 *a*, larva & pupa; *de N. & Aitken* (Belenois), *J. A. S. B.* 1896, p. 575; *Mackinnon & de N.* (Belenois), *Jour. Bomb. N. H. Soc.* xi, 1898, p. 590; *Moore*, *Lep. Ind.* vi, 1904, p. 158, pl. 527, figs. 1, 1 *a*–1 *h*, larva & pupa, ♂ ♀.

Pieris lordaca, *Walker*, *Entomologist*, v, 1870, p. 48; *Yerbury* (Belenois), *Jour. Bomb. N. H. Soc.* vii, 1892, p. 216.

Belenois aurigenea, *Butler*, *P. Z. S.* 1886, p. 374, ♀.

Race taprobana.

Pieris taprobana, *Moore*, *P. Z. S.* 1872, p. 565; *id.* (Belenois) *Lep. Ceyl.* i, 1881, p. 137, pl. 53, figs. 3, 3 *a*, 3 *b*, ♂ ♀; *id.* (Anaphæis) *Lep. Ind.* vi, 1904, p. 162, pl. 527, figs. 2, 2 *a*–2 *c*, ♂ ♀.

Wet-season form.—♂. *Upperside*: white. Fore wing: costa to base of vein 11 dusky black, thence continued in a jet-black, gradually widened, curved, short streak along the discocellulars to the lower apex of cell; apical area diagonally with the termen black, the former with six elongate outwardly pointed spots of the ground-colour enclosed one in each of the interspaces 3, 4, 5, 6, 8 and 9. Hind wing: uniform, the black along the venation on the underside seen through by transparency; termen between veins 2 and 6 somewhat broadly black, with a series of four round spots of the ground-colour in the interspaces; below vein 2 and above vein 6 the termen is very narrowly black. *Underside*: fore wing white, markings similar, more clearly defined, the white spots within the black apical area larger. Hind wing: yellowish white, all the veins very broadly bordered with black; interspaces 1, 2, 6 and 7 with cross-bars of black, beyond which there is a subterminal, somewhat broad, transverse band of black between veins 2 and 6. Cilia of both fore and hind wings white alternated with black. The ground-colour on both upper and under sides variable, often cream-coloured above; beneath: in some specimens, the base of cell and the elongate spots in apical area of fore wing, and the whole surface of the hind wing varies to rich chrome-yellow. —♀. Similar; the black markings on both upper and under sides broader, the white spots on black apical area of fore wing often subobsolete above. Antennæ in both sexes black, sparsely sprinkled with white dots; head, thorax and abdomen above and below white; thorax above often bluish grey.

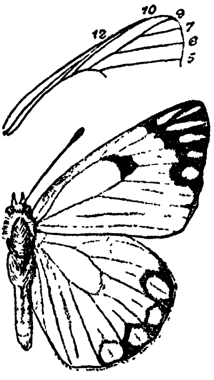

Fig. 39.—*Anaphæis mesentina*, ♂.

Dry-season form.—♂ ♀. Similar to ♂ ♀ of wet-season form but on the upperside the black markings are narrower, the white markings on the black apical area of fore wing broader and longer, and on the hind wing the narrow inner margining to the black on the termen very narrow, somewhat obsolescent; therefore, the white subterminal spots have the appearance of opening inwards. *Underside*: ground-colour almost pure white; on the hind wing slightly tinged with yellow. Antennæ, head, thorax and abdomen as in the wet-season form.

Exp. ♂ ♀ 44–62 mm. (1·72–2·45″).

Hab. Within our limits, the Himalayas from Kashmir to Sikhim at elevations below 6000 feet, and through the plains to Southern India. In the Nilgiris observed up to 8000 feet (*Hampson*). It does not seem to occur in Assam or Burma, but I possess a specimen of the dry-season form taken by Mr. G. Rogers, Deputy Conservator of Forests, in April 1903, in the Ganges harbour, Great Nicobar Island. To the west it spreads through Persia and Arabia to East Africa.

A very variable insect. Messrs. Davidson, Bell and Aitken state that the larvæ feed on capers, that they are "gregarious throughout their existence," and that "the eggs are laid in batches of from ten to forty."

Larva. "When hatched a line long, olive colour, with a distinct glossy jet-black head. *After first moult.*—One fourth inch long; grass-green; dorsal line very distinct, dark green; lateral line very broad, plum-coloured and mottled, dentated into the ground-colour, on the last two segments on its upperside; a small white spot on either side of dorsal line on each segment; a yellow spot on each segment on the lateral line on either side; abdomen glossy green; ventral line distinct, rather interrupted, grass-green; all the legs green, hairy; head shiny black with a green triangular mark in front, covered with stiff whitish hairs; stigmata dark-coloured; sides greyish green, slightly wrinkled transversely; the portion of ground-colour between lateral and dorsal line slightly powdered with yellow; hair whitish grey; anal segment black and hairy; first segment rather swollen in front. *After last moult.*—Length 1¼ inch long; cylindrical, broader towards the head, slightly tomentose on back, hairy on the sides; otherwise as after first moult......... Food-plant, the pea-leaved Caper (*Capparis pyrifolia*)."

Pupa. "Five-eighths of an inch long, transparent, pale cream-colour. In front a longish tubercle directed forwards, with a black mark on each side, and a smaller one on either side of 4th segment perfectly black; a lateral line of pale plum-colour, on which is a longitudinal line of yellow round dots, one on each segment, and a transverse row of dots on each segment; dashed and marked with black, particularly on the abdomen. After the escape of the imago, the 5th and 6th segments of the pupa become blood-red." (*Capt. H. L. Chaumette MS. notes as quoted by Moore.*)

Race **taprobana**, Moore.—Differs from the typical form as follows:—♂. *Upperside*, fore wing: deep black on apical area, the enclosed white elongate spots more or less obsolete. Hind wing: the black terminal border much broader and of a deeper black, the enclosed white spots, except the spot in interspace 6, very much smaller, somewhat obsolescent, sometimes absent in interspace 4. *Underside*: similar to the upperside, the markings of a very intense black and broader, the enclosed spots in the apical area of fore wing, the white of the cell and the area along the upper half of the wing generally overlaid with rich chrome-yellow. Hind wing: ground-colour a deep rich chrome-yellow, the spots on it enclosed in the black along terminal margin subhastate, the spot in interspace 4 absent.—♀. Similar to the ♂ on both upper and under sides, but in all the specimens I have seen, on the upperside the spots of the white ground-colour that are enclosed in the black apical area of the fore wing and the spots on the black border along the terminal margin of the hind wing are entirely absent. Antennæ, head, thorax and abdomen as in the typical form.

Exp. ♂ ♀ 52–58 mm. (2·02–2·28").

Hab. Apparently confined to Ceylon in the low country.

Genus **BALTIA.**

Baltia, *Moore, A. M. N. H.* (5) i, 1878, p. 228; *Kirby, Entomologist,* 1894. p. 100; *Dixey, Trans. Ent. Soc.* 1894, pp. 249, 334; *Kirby, Allen's Nat. Libr., Butt.* ii, 1896, p. 156.

Type, *B. shawi*, Moore, from Ladakh.

Range. N.W. Himalayas, Tibet.

♂ ♀. Fore wing: costa strongly arched at base, almost straight to apex, slightly emarginate in the middle, apex blunt; termen convex; tornus obtusely angulate, dorsum straight; cell more than half length of wing; veins 5 and 6 both shifted up and given off from lower side of vein 7 beyond apex of cell, thus only one discocellular is present; veins 8 and 9 absent, 10 moved up and forms a short fork with 7 before apex of wing, 11 free. Hind wing oval with vein 8 very short, the precostal spur or nervure turned inwards. Antennæ slender, about half length of fore wing; club large, gradual; head and thorax very hairy.

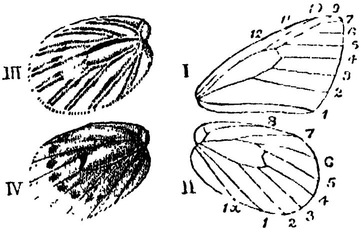

Fig. 40.—*Baltia.*
I. Venation: front wing.
II. „ hind wing.
III. Hind wing: *B. butleri.*
IV. „ *B. shawi.*

Key to the forms of Baltia.

a. Underside hind wing: irrorated diffusely all over with black scales .... *B. shawi*, p. 159.

b. Underside hind wing: not diffusely irrorated with black, the veins evenly bordered on each side by broad lines of black scales .... *B. butleri*, p. 159.

582. **Baltia shawi,** *Bates* (Mesapia), *Henderson & Hume's Lahore to Yarkund,* 1873, p. 305; *Moore, A. M. N. H.* (5) i, 1878, p. 228, ♂ ♀; *id. Sci. Res. 2nd Yark. Miss., Lep.* 1879, p. 3, pl. 1, fig. 5 ♂; *id. Lep. Ind.* vi, 1904, p. 144, pl. 522, figs. 2, 2*a*–2*c*, ♂ ♀.

♂. *Upperside*: dead white; base of wings irrorated with black scales. Fore wing: costal margin very narrowly yellowish, costal and subcostal nervures irrorated with black scales, a discocellular elongate oblique black spot; a narrowly subtriangular short oblique preapical black bar, its apex downwards, and a series of inwardly triangular black spots on the termen, these narrow posteriorly and reach from the apex of wing to vein 1. Hind wing: uniform, the irroration of black scales more extended than on the fore wing. *Underside*: fore wing white; costa and apex irrorated with black scales, the costa and termen margined with a line of pinkish yellow; the black discocellular spot, the black preapical bar and terminal series of black spots much as on the upperside, but the last is ill-defined, somewhat diffuse at apex and does not descend below vein 3. Hind wing: white with a dull pinkish tinge all over; the whole surface irrorated with black scales that form a broad elongate patch on posterior half of the wing and an obscure curved macular discal band beyond the cell; discocellulars defined with black.—♀ differs from the ♂ as follows:—*Upperside*: somewhat thickly irrorated all over with black scales. Fore wing with the discocellular black spot and terminal series of inwardly-pointed triangular black spots as in the ♂, but the latter more complete, extends from apex to tornus, the spots are larger and there is no preapical bar, but a complete, outwardly dentate, curved discal black band that crosses the wing from costa to dorsum. Hind wing: the irroration of black scales very dense in a broad patch posteriorly, and so arranged as to form a curved macular discal band. *Underside*: similar to that of the ♂, but on the fore wing there is a complete terminal series of inwardly triangular black spots and a complete, outwardly dentate, curved discal black band; while on the hind wing the irroration of black scales is more dense. In both sexes the antennæ are white annulated with black, the club black; head whitish; thorax and abdomen fuscous black; beneath: head and thorax fuscous black, abdomen prominently white.

Exp. ♂ ♀ 34–50 mm. (1·34–1·99″).

Hab. Within our limits recorded from the Karakoram Mountains at an elevation of 18,000 feet; found also beyond British territories in the Pamirs and Tibet.

583. **Baltia butleri,** *Moore* (Synchloe), *P. Z. S.* 1882, p. 256, pl. 11, figs. 6, 6*a*, ♂; *Kirby, Entomologist,* 1894, p. 100; *id. Allen's Nat. Libr., Butt.* ii, 1896, p. 156; *Moore, Lep. Ind.* vi, 1904, p. 145, pl. 522, figs. 3, 3*a*, 3*b*, ♂ ♀.

♂ ♀. Closely resembles *B. shawi*, from which it differs as follows:—♂. *Upperside*: ground-colour similar. Fore wing: the black markings also more or less similar but altogether smaller and narrower, the terminal series of spots reduced to three or four. Hind wing: similar, but there are two conspicuous black spots on the discocellulars. *Underside*, fore wing: ground-colour white, veins dusky, costa narrowly and apex suffused with pinkish ochraceous; the discocellular black spot as on the upperside; veins, 4, 5, 6, and apical portion of 7 broadly bordered on each side with black scales that run parallel to but do not touch the veins. Hind wing: ground-colour pinkish ochraceous, the veins conspicuously white; all of them, except a small portion in the middle of the discocellulars, bordered, in the manner similar to the veins at the apex of the fore wing, with broad lines of black scales on each side.—♀. *Upperside* similar to the upperside of *B. shawi* ♀, but the wings are irrorated with black scales only at their bases; the black markings on the fore wing are altogether smaller and narrower, and the black curved, outwardly dentate, discal band becomes diffuse and ill-defined posteriorly. On the hind wing the discocellulars are prominently marked with an upper and a lower black spot, and the discal macular band is more conspicuous than in *B. shawi* ♀. *Underside* precisely as in the ♂, except that on the fore wing the discal black band is seen through by transparency from the upperside. In both sexes the antennæ, head, thorax and abdomen as in *B. shawi*.

Exp. ♂ ♀ 42–54 mm. (1·68–2·12″).

Hab. Within our limits recorded from Ladakh: the Digha Pass; 15,000 feet north of Leh in Kashmir; the Kardong Pass in the Karakoram, 15,000 to 18,000 feet.

A variety, var. *potaxini*, Alphéraky, is recorded from the Nian-Shan, Koko-Nor, and Western China. It differs from the typical form on the *upperside*, in the ♂ by the restriction and narrowness of the black markings, in the ♀ by the ground-colour which is tinged with greenish yellow. On the underside there seems to be scarcely any difference.

Genus **APORIA.**

Aporia, *Hübner, Verz. bek. Schmett.* 1816, p. 90; *Kirby, Allen's Nat. Libr., Butt.* ii, 1896, p. 139.

Type, *A. cratægi*, Linn., from Europe.

Range. Europe; Northern Asia; Japan; China; the Himalayas from Chitral to Bhutan; Assam; the Khasia Hills.

♂ ♀. Fore wing typically elongate, the dorsum very nearly three-fourths the length of the costa; costa very slightly arched; apex blunt; termen convex; tornus rounded; dorsum straight; cell elongate, more than half length of wing; discocellulars oblique; vein 6 from end of basal third of 7, upper discocellular therefore absent, middle very little shorter than lower; vein 8 lost, vein 9 out of 7 close to apex, 10 and 11 free, 10 from just before upper apex of cell. Hind wing: comparatively long, narrow, subpyriform; cell elongate, discocellulars outwardly oblique; precostal vein simple, straight. Antennæ about half length of fore wing, club flattened, gradual; palpi slender, subporrect, hairy in front, third joint about half length of second.

Key to the forms of Aporia.

A. Upperside: ground-colour white, veins more or less black, but that colour never dilated where the veins cross disc of wings, no irroration of black scales except slightly at base of wings.

- *a.* Upperside: fore wing without or rarely with an anterior postdiscal transverse black band. Of comparatively large size, expanse over 60 mm. .... *A. soracte*, p. 161.
- *b.* Upperside: fore wing with an anterior postdiscal transverse black band always present. Of comparatively small size, expanse well under 60 mm. .... *A. balucha*, p. 162.

B. Upperside: ground-colour white, generally thickly overlaid with an irroration of black scales at least over the basal half or three-fourths of wings .... *A. nabellica*, p. 163.

C. Upperside: ground-colour black or dark brownish-black, or if white then veins of both fore and hind wings broadly bordered with black, that colour dilated where veins cross disc of wings.

- *a.* Upperside: ground-colour black.
  - *a'.* Upperside: markings on both fore and hind wings white, narrow; white streak in interspace 1 of fore wing always more or less traversed by a longitudinal black line .... *A. agathon*, p. 163.
  - *b'.* Upperside: markings on both fore and hind wings white, broad; white streak in interspace 1 of fore wing not divided or traversed longitudinally by a black line .... *A. agathon*, var.? *caphusa*, p. 165.
- *b.* Upperside: ground-colour white, veins broadly bordered with black, that colour dilated where veins cross disc of wings .. *A. agathon*, var.? *phryxe*, p. 166.

584. **Aporia soracte**, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 83; *id. P. Z. S.* 1882, p. 256, pl. 11, fig. 5, larva; *Mackinnon & de N. Journ. Bomb. N. H. Soc.* xi, 1898, p. 589.

♂ ♀. *Upperside*: milk-white, with all the veins, especially of the fore wing, black, the black edging to the discocellulars and apical portion of the median vein of the fore wing broader; the apices of veins 3 to 7 increasingly broadly black-marked. Hind wing uniform. Both fore and hind wings with a slender marginal black line along costa, termen and dorsum; this is more or less interrupted in the middle of the dorsum of the fore wing; base with a slight irroration of black scales. *Underside*: ground-colour white; fore wing on costa narrowly and on apex, hind wing all over, suffused with pale yellow; markings similar. Hind wing: the precostal area chrome-yellow, the discocellulars somewhat prominently defined with black; interspace 2 divided longitudinally by a black line. Cilia of wings dusky brown. Antennæ black; head, thorax and abdomen white, generally strongly suffused with fuscous black; beneath: head, thorax and abdomen white.

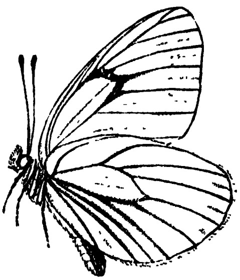

Fig. 41.—*Aporia soracte*.

Exp. ♂ ♀ 60–72 mm. (2·38–2·84").

Hab. N.W. Himalayas: Kashmir to Kumaon.

The markings on both upper and under sides are to some extent variable, but I have not seen a sufficient number of dated specimens to make out whether the variation is seasonal or not. Thus many, both males and females, have on the upper and under sides of the fore wing a postdiscal, curved, diffuse, transverse black band between veins 2 and 3 continued anteriorly from veins 4 to 10; a few specimens have also on the hind wing, both on the upper and under sides, some diffuse black scaling on the disc that takes the form of outwardly acute sagittate marks in the interspaces.

585. **Aporia balucha**, *Marshall, P. Z. S.* 1882, p. 760; *Swinhoe, Trans. Ent. Soc.* 1885, p. 342; *Moore* (Pieris), *Lep. Ind.* vi, 1904, p. 150.
Metaporia sorex, *Grose-Smith, A. M. N. H.* (5) xx, 1887, p. 129; *id. & Kirby, Rhop. Exot.* i, 1889, *Pierinæ*, p. 7, pl. 2, figs. 8, 9.
Pieris leechii, *Moore, Lep. Ind.* vi, 1904, p. 150.

♂ ♀. Resembles *A. soracte*, but is smaller, and may be distinguished as follows:—*Upperside* fore wing: the discocellular black spot broader, the dilatation of the black at the apices of the veins also much more marked; in addition there is always a black postdiscal band that runs obliquely from costa at apex of vein 10 to vein 5, thence transversely to vein 2, subinterrupted in interspace 3 and broadened in interspaces 2 and 4. *Underside*: differs from that of *soracte* in the apex of the fore and the whole of the hind wing, which are suffused with a darker yellow, the black edging to the veins is broader on both fore and hind wings, and a postdiscal black band is always present on both wings; on the fore wing this is similar to that on the upperside, but on the hind wing it takes the form of a strongly-curved, connected series of outwardly acutely-pointed, arrow-shaped marks in the interspaces. Antennæ, head, thorax and abdomen as in *A. soracte*.

Exp. ♂ ♀ 48–54 mm. (1·88–2·1").

Hab. N.W. Himalayas: Chitral; Baluchistan; Baltestan below the Skoro La at 12,000 feet.

586. **Aporia nabellica,** *Boisduval* (Pieris), *Spec. Gén. Lép.* i, 1836, p. 509; *Butler* (Metaporia), *P. Z. S.* 1872, p. 61; *Mackinnon & de Nicéville, Journ. Bomb. N. H. Soc.* xi, 1898, p. 589; *Moore* (Pieris), *Lep. Ind.* vi, 1904, p. 151, pl. 524, figs. 1 *a*, 1 *b*, ♂ ♀.

♂ ♀. *Upperside*: white, with the veins more or less black, but the ground-colour in most of the specimens that I have seen so densely overlaid by black scales over nearly the whole surface of both fore and hind wings as to leave only a subterminal series of more or less rectangular spots of the white ground-colour apparent on each wing, those on the hind wing are the largest and are inwardly acutely emarginate. In addition, there is a large ill-defined black patch on the discocellulars of the fore wing and a small spot of the same colour generally on the discocellulars of the hind wing. Cilia of both wings black. In nearly all specimens the discoidal cells of the wings are greyish, and on the fore wing there are anterior discal, elongate, greyish spots beyond the apex of the discoidal cell. A few specimens, generally females, are much lighter in colour. In these the irroration of black scales is sparse and allows much of the white ground-colour to show through; the discocellulars of the fore wing, however, are marked by a large black patch as in the darker individuals; and both fore and hind wings bear postdiscal, irregular, transverse black bands; that on the fore wing bisinuate, sometimes not extended below vein 2; that on the hind wing not reaching the dorsal margin, curved, and formed of somewhat ill-defined, irregular, conjoined, outwardly acute, arrow-shaped black spots. *Underside*: white, the veins on both wings very broadly black-edged; apex of fore wing very slightly, the whole surface of the hind wing more strongly suffused with yellow; the fore wing sometimes clouded posteriorly with black scaling; both fore and hind wings with postdiscal transverse black bands as on the upperside but broader; the base of the hind wing above vein 8 chrome-yellow. Antennæ black, the club ochraceous at apex; head and thorax clothed with fine dusky greyish-black hairs; abdomen black above, beneath greyish white.

Exp. ♂ ♀ 60–70 mm. (2·38–2·78").

Hab. W. Himalayas: Kashmir to Naini Tal, 8,500 to 13,000 feet.

587. **Aporia agathon,** *Gray* (Pieris), *Zool. Misc.* 1832, p. 33; *Boisduval* (Pieris), *Spec. Gén. Lép.* i, 1836, p. 447; *Butler* (Metaporia), *Cist. Ent.* i, 1870, p. 51, pl. 3, fig. 10; *Elwes* (Pieris—Aporia), *Trans. Ent. Soc.* 1888, p. 415; *Mackinnon & de Nicéville, Journ.*

Bomb. Nat. Hist. Soc. xi, 1898, p. 590; *Moore* (Metaporia), *Lep. Ind.* vi, 1904, p. 156, pl. 526, figs. 2, 2 *a*–2 *b*, ♂ ♀.

Pieris phryxe, *Boisduval, Spec. Gén. Lép.* i, 1836, p. 446; *Butler* (Metaporia), *P. Z. S.* 1872, p. 61; *Mackinnon & de Nicéville* (Aporia), *Journ. Bomb. Nat. Hist. Soc.* xi, 1898, p. 589; *Moore* (Metaporia), *Lep. Ind.* vi, 1904, p. 154, pl. 525, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Metaporia caphusa, *Moore, P. Z. S.* 1872, p. 564, ♂ ♀; *Mackinnon & de Nicéville* (Aporia), *Journ. Bomb. Nat. Hist. Soc.* xi, 1898, p. 589, pl. v, figs. 20, *a*, *b*, *c*, larva & pupa; *Moore, Lep. Ind.* vi, 1904, p. 155, pl. 525, figs. 2, 2 *a*–2 *c*, larva & pupa, ♂ ♀.

Metaporia ariaca, *Moore, P. Z. S.* 1872, p. 564, ♂; *Mackinnon & de Nicéville* (Aporia), *Journ. Bomb. Nat. Hist. Soc.* xi, 1898, p. 590; *Moore, Lep. Ind.* vi, 1904, p. 156, pl. 526, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Not until very careful breeding experiments have been carried out will it be possible to ascertain for certain whether under the above references I have included three * allied but distinct forms, or whether, as I am inclined to think and as I have treated them here, these represent but one extremely variable insect that to a certain extent, irrespective of seasonal influences or environment, ranges in colour from the very dark *A. agathon* to the comparatively pale-coloured *A. phryxe.* Had the habitat of these three more or less distinguishable varieties or forms been separate and restricted, they could have been treated as fairly well-marked races, but this is not the case, for Mr. Mackinnon, I understand, has taken all three flying together on the same day and on the same spot at Mussoorie. I think it quite probable that were the whole region over which *agathon* or its varieties occur thoroughly searched, one or two, if not more, specimens of each would be found.

Typical form, *A. agathon*, Gray.—♂ ♀. *Upperside*: black; fore and hind wings with the following white or greenish-white streaks and spots in the discoidal cells and in the interspaces. Fore wing: a broad streak in cell, two more or less confluent streaks obscurely divided by a diffuse blackish line below it in interspace 1, followed by an upper discal series of five short lines in interspaces 3, 4, 5 and 10, and a subterminal complete series of elongate narrow spots; both the discal and subterminal series are curved inwards anteriorly. In most specimens the streaks in interspace 1 and in cell are irrorated with black scales. Hind wing: a broad streak along the dorsum divided by vein 1 *a*, two narrow long streaks in interspace 1, a much broader elongated oval streak in cell, with another elongate broad streak above it in interspace 7, a discal series of five narrow elongate spots beyond apex of cell, followed by a complete subterminal series of more or less oval spots. *Underside*: ground-colour and markings similar, more clearly defined, and on the fore wing generally broader and whiter, except that the anterior one or two streaks or spots of the discal and subterminal series, like all the markings on the hind wing, are strongly suffused with bright yellow; in addition the precostal area on the hind wing is bright chrome-yellow. Antennæ, head, thorax and abdomen black; abdomen beneath white, the anterior legs with one or two white spots.

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* Mr. Moore holds that there are four, not three, distinct "species"; but, even allowing the distinctness of *A. agathon*, *A. caphusa*, and *A. phryxe*, *A. ariaca*, Moore, is so very close to *A. agathon*, that in any large series it would be impossible to separate the former from the latter.

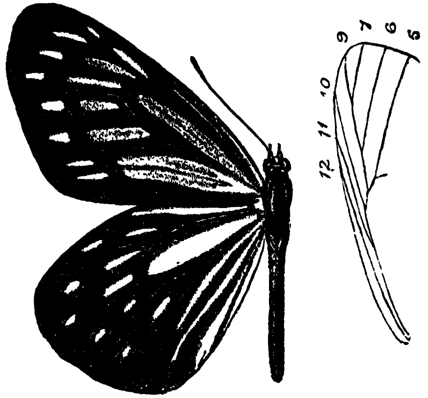

Fig. 42.—*Aporia agathon.*

Exp. ♂ ♀ 84–98 mm. (3·3–3·86″).

Hab. Assam; Bhutan; Sikhim; Nepal; recorded from Mussoorie and Kumaon.

I have not seen the type of *A. ariaca*, Moore, but, as described and figured in the 'Lepidoptera Indica,' I am unable to separate from it the browner specimens of *A. agathon*, which the figures given resemble more closely than they do the variety *A. caphusa*, with which Mr. Moore compares it.

Var. *caphusa*, Moore.—♂ ♀. Differs from *agathon* both on the upper and under sides in the much greater width and extension of the greenish-white markings in the discoidal cells and interspaces of the wings. On the upperside the streak in interspace 1 of the fore wing shows no sign of any black dividing-line, and it, as well as the short streaks of the discal series, show a tendency to coalesce with the subterminal elongate spots. On the underside the spots near apex of fore wing and those on the hind wing are only faintly, not clearly, suffused with yellow; the chrome-yellow spot at base of the latter as in *agathon*. Antennæ, head, thorax and abdomen as in *agathon*, the abdomen more dark brown than black.

Exp. ♂ ♀ as in *agathon.*

Hab. Sikhim; Kumaon; Mussoorie to Simla and the Kangra district.

Larva. "The larvæ of *A. caphusa* are gregarious, and to pupate burrow under the dry leaves at the foot of their food-plant, the pupæ being also gregarious. The larvæ spin a joint web, and lie together in communities of ten or more. They feed at night only. Colour when full-grown dirty brown, head black, each segment with a dorsal longitudinal dark brown stripe; the larva is thinly covered with weak white hairs. Just before pupation the colour turns to a light green, with the head and stripes as before." (*Mackinnon.*)

Pupa. "Very similar in shape to that of *A. soracte*, is greenish-yellow with black markings." (*Mackinnon.*)

Food-plant of larva.—"*Berberis nepalensis*, Spring." (*de Nicéville.*)

Var. *phryxe*, Boisduval.—This is the palest of the series of the varieties of *agathon*. The intercellular and interspacial greenish-white streaks and spots, which, in var. *caphusa*, are considerably longer and broader and, so far as the markings in the interspaces are concerned, show a tendency to coalesce, in *phryxe* become very broad and white, so that the discal series of short streaks on both wings extend to and coalesce completely with the much broadened spots of the subterminal series. In fact, the insect may be described as white both on the upper and under sides, the veins broadly bordered with black, and with black terminal margins formed by the expansion and coalescence of the black at the apices of the veins; discoidal cell of the fore wing with a large patch of black at the apex. The black along the veins of both fore and hind wing suddenly broadened on the discal area; on the underside of the hind wing they almost form a connected discal, transverse black band; the chrome-yellow spot on the precostal area as in *agathon*. Antennæ black, head and thorax dusky grey, abdomen white; beneath: head and thorax blackish, abdomen white.

Exp. ♂ ♀ 78–90 mm. (3·08–3·56").

Hab. N.W. Himalayas: Mussoorie; Simla; Kashmir; Kangra.

588. **Aporia harrietæ**, *de Nicéville* (Metaporia), *Journ. Bomb. N. H. Soc.* vii, 1892, p. 341, pl. 1, figs. 3, 4, ♂ ♀; *Moore* (Pieris), *Lep. Ind.* vi, 1904, p. 152, pl. 524, figs. 2, 2 *a*, 2 *b*, ♂ ♀.

"♂. *Upperside*: both wings black. *Fore wing* with a thin white streak at the base of the costa; a large creamy-white patch occupying the basal three-fourths of the discoidal cell, its outer end produced to a point; a large patch occupying the basal two-thirds of the interno-median interspace (interspace 1), a discal series of five more or less oval spots curving evenly round the outer end of the cell, of which the anterior one is rather elongated and narrow, the three following are equal-sized elongated ovals, the posterior one in the first median interspace (interspace 2) is the largest and occupies the base of the interspace; the outer margin bears, one in each interspace at its middle, a series of somewhat diffused white spots. *Hind wing* has the veins on the basal half of the wing defined with white, broadly margined on both sides with black; the discoidal cell almost entirely creamy-white; there is a very narrow costal and a wide subcostal streak, then five spots—one in each interspace—beyond the cell, that in the second median interspace (interspace 3) the smallest; two elongated streaks in the submedian interspace (interspace 1), the inner one almost reaching to the margin of the wing, the outer one reaching to about halfway between the base of the wing and the margin; two basal white streaks occupying the whole of the interspaces divided by the internal nervure (vein 1 *a*); marginal diffused spots as in the fore wing, but each spot divided into two by the black internervular fold. *Underside*: differs from the upperside only in having on the outer margin from the costa to the second median nervule (vein 3) a decreasing series of duplicated white streaks, one pair in each interspace, a small white spot in the two following interspaces. Hind wing has at the extreme base of the wing within the precostal nervure the usual bright yellow patch characteristic of the genus; all the creamy-white markings of the upperside are pale yellow; the markings differ from those on the upperside by the presence of a pair of elongated wedge-shaped pale yellow streaks in each interspace, each streak has its apex pointed, its base (which is placed on the outer margin) broad. Cilia of both wings on both sides black.—♀ differs from the ♂ only in being somewhat paler throughout." (*de Nicéville, MS.*)

Exp. "♂ 2·9; ♀ 3 inches."

Hab. "Bhutan." (*de Nicéville.*)

Unknown to me.

Genus PIERIS.

Pieris, *Schrank, Fauna Boica*, 1801, pp. 152, 164; *Latr. Hist. Nat. Crust. et Ins.* xiv, 1805, p. 111.

Mancipium, *Hübner, Tentamen*, 1806, p. 1.

Pontia, *Fabr. Illig. Mag.* vi, 1807, p. 283; *Moore, Lep. Ind.* vi, 1904, p. 136.

Ganoris, *Dalmann, Vet.-Akad. Handl.* xxxvii, 1816, pp. 61, 86.

Parapieris, *de Nicéville, J. A. S. B.* 1897, p. 563.

Type, *P. rapæ*, Linn., from Europe.

Range. Europe; Northern Asia; Himalayas, Northern India and China.

♂ ♀. Fore wing: costa arched, apex angular; termen straight; tornus broadly rounded; dorsum straight or slightly sinuous, more than three-fourths the length of the costa; cell elongate, more than half length of wing; discocellulars comparatively short, upper absent, middle oblique, lower concave or even, slightly angulated inwards; vein 6 from apex of basal third of 7, 8 absent, 9 rudimentary, a minute branch almost disappearing near apex of wing, 10 and 11 free, both from upper third of subcostal. Hind wing: subtriangular, the costa very long, both apex and tornus evenly rounded, the termen short, gently arched; cell more than half length of wing, acutely pointed at lower apex, lower discocellular the longest; precostal vein curved outwards, short. Antennæ about half length of fore wing or a little less, club well-formed but gradual; palpi porrect, slender, third joint short.

I have taken the genus *Pieris* in a wide sense as including forms placed by many authors under *Mancipium*, *Pontia*, etc. The forms separated off from *Pieris*, such as *brassicæ* under *Mancipium*, *daplidice*, etc. under *Pontia*, show, so far as the movement of the veins in the fore wing are concerned, degrees of specialization. In the genus *Pieris*, as in the family *Pieridæ* already noted above, the veins of the median and costal systems in the fore wing show a tendency to shift upwards and outwards towards the apex of the wing and so to disappear. The exact position of any such vein is, therefore, not always constant in the forms of any genus, nor often, indeed, in individuals belonging to the same form.

Key to the forms of Pieris.

- A. Underside hind wing: markings not green.
  - *a*. Upperside fore wing: no preapical triangular black patch on costa.
    - a'. Underside: veins of wings not defined with black.
      - a^2. Upperside fore wing: apical black patch not extended along termen below vein 4 .... *P. rapæ*, p. 169.
      - b^2. Upperside fore wing: apical black patch extended along termen to below vein 3.
        - a^3. Upperside fore wing: inner margin of black apical area evenly curved.
          - a^4. Underside hind wing: irrorated with black scales............ *P. brassicæ*, p. 170.
          - b^4. Underside hind wing: not irrorated with black scales, uniform ochraceous yellow .... *P. naganum*, p. 171.
        - b^3. Upperside fore wing: inner margin of black apical area not evenly curved, sinuous or scalloped.
          - a^4. Upperside hind wing: with a continuous terminal black band; in ♀ only traversed very narrowly by the white veins .... *P. deota*, p. 171.
          - b^4. Upperside hind wing: without a continuous terminal black band, only a series of well-divided black spots often mere specks . *P. canidia*, p. 172.

b'. Underside: veins of wings defined with black.

a^2. Underside hind wing: black edging defining veins narrow; ground-colour of wing white .... *P. melete*, p. 173.

b^2. Underside hind wing: black edging defining veins very broad; ground-colour of wing yellow .... *P. chumbiensis*, p. 174.

b. Upperside fore wing: a preapical triangular black patch on costa .... *P. krueperi*, race *devta*, [p. 175.

B. Underside hind wing: markings green.

a. Underside hind wing: veins concolorous with ground-colour of wing.

a'. Underside hind wing: the green markings are interrupted and leave a connected, irregular, more or less sinuous, transverse discal band of the white ground-colour apparent.

a^2. Underside hind wing: green edgings to terminal portions of veins not straight, clavate .... *P. daplidice*, p. 175.

b^2. Underside hind wing: green edgings to terminal portions of veins straight, not clavate .... *P. chloridice*, p. 177.

b'. Underside hind wing: the green markings are continuous and leave only lanceolate spots of the white ground-colour apparent, no discal band .... *P. callidice*, p. 178.

b. Underside hind wing: veins not concolorous with ground-colour of wing, yellow.... *P. glauconome*, p. 176.

589. **Pieris rapæ**, *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 468; *Butler* (Ganoris), *P. Z. S.* 1881, p. 612; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 131, pl. 519, figs. 1, 1 *a*-1 *c*, ♂ ♀.
Pontia mannii, *Meyer, Stett. ent. Zeit.* 1851, p. 151; *Butler* (Ganoris), *P. Z. S.* 1880, p. 411.

♂. *Upperside*: white; base of both wings and costa of fore wing for a short distance sparsely irrorated with black scales. Fore wing sometimes narrowly, sometimes broadly black; a round black spot in the middle of interspace 3. Hind wing uniform with only a very short, transverse, laterally compressed, and generally diffuse black spot in interspace 7 that crosses vein 7 to the costa. *Underside*: ground-colour similar. Fore wing: upper half of cell and costal margin above it sparsely irrorated with black scales; apex faintly shaded with ochraceous or cream colour; a black spot in interspace 3 as on the upperside and another in line with it below in interspace 1. Hind wing: dorsal margin somewhat broadly white, remainder of wing cream-colour; base and cell sparsely irrorated with black scales. Antennæ, head, thorax and abdomen black checkered with white scales and a little whitish pubescence on the head and thorax; beneath: head, thorax and abdomen white.—♀. Similar to the ♂, but in fresh specimens on the upperside the white on the wings is tinged slightly with cream-colour, and the additional black spot in interspace 1 is always present on the upper as well as on the under side. *Underside*: the ground-colour at apex of fore and over the whole of the hind wing more strongly suffused with yellow than in the ♂.

Exp. ♂ ♀ 50–58 mm. (1·96–2·3″).

Hab. Europe and Western Asia. Within our limits in the N.W. Himalayas; Chitral; Ladakh; Kashmir, from 7000 to 12,000 ft.

Larva. As found in Europe: yellow at first, changing in the adult to green, with a yellow dorsal stripe and lateral yellow spiracular spots, covered all over above with black dots that bear each a pale hair.

Pupa. "Angulated; variable in colour, chiefly grey or drab of different intensity and freckled with black; some are dull greenish." (*Tutt.*)

590. **Pieris brassicæ**, *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 467; *Godart, Encycl. Méth.* ix, 1819, p. 158; *Lang, Butt. Eur.* 1884, p. 28, pl. 6, figs. 2 ♂ ♀, pl. 15, figs. 2, larva & pupa; *Elwes, Trans. Ent. Soc.* 1888, p. 416; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 127, pl. 518, figs. 1, 1 *a*, ♂ ♀.

Pieris brassicæ, var., *Gray, Lep. Ins. Nepal,* 1846, p. 6, pl. 6, figs. 1, 3.

Mancipium nipalense, *Moore, P. Z. S.* 1882, p. 256; *Swinh.* (Ganoris) *Trans. Ent. Soc.* 1885, p. 343.

♂. *Upperside*: creamy white with a somewhat farinaceous appearance. Fore wing: an irroration of black scales at base and along costa for a short distance; apex and termen above vein 2 more or less broadly black, the inner margin of the black area with a regular even curve; in one or two specimens a small longitudinally narrow black spot in interspace 3. Hind wing: uniform, irrorated with black scales at base, a large black subcostal spot before the apex, and in a very few specimens indications of black scaling on the termen anteriorly. *Underside*, fore wing: white, slightly irrorated with black scales at base of cell and along costa, apex light ochraceous brown; a large black spot in outer half of interspace 1, and another quadrate black spot at base of interspace 3. Hind wing: light ochraceous brown closely irrorated with minute black scales; the subcostal black spot before the apex shows through from the upperside. Antennæ black, white at apex; head, thorax and abdomen black, with some white hairs; beneath: whitish.— ♀. *Upperside*: similar to that of the ♂ but the irroration of black scales at the bases of the wings more extended; the black area on apex and termen of fore wing broader, its inner margin less evenly curved; a conspicuous large, black spot in outer half of interspace 1, and another near base of interspace 3.

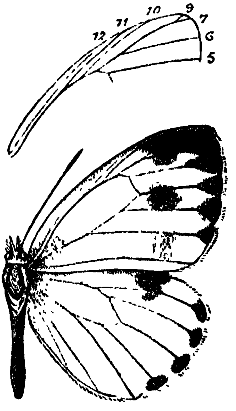

Fig. 43.—*Pieris brassicæ.*

On the hind wing the subcostal black spot before apex much larger, more prominent. *Underside*: similar to that of the ♂ but the apex of the fore wing and the whole surface of the hind wing light ochraceous yellow, not ochraceous brown; the black discal spots on fore wing much larger. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 62–78 mm. (2·46–3·10″).

Hab. Europe; Northern and Central Asia; the Himalayas from Chitral to Bhutan up to 10,000 feet; descending in the North-west of India to as low as Umballa (*fide Lang*).

591. **Pieris naganum**, *Moore* (Mancipium), *J. A. S. B.* 1884, p. 45, ♂; *id.* (Danaus), *Lep. Ind.* vi, 1904, p. 130.

♂. *Upperside*: white. Fore wing: costa irrorated with black scales for about two-thirds of its length from base, thence the apex broadly, and the termen to vein 3 more narrowly, black, the inner margin of the black area curved; discocellulars with a crescentic black mark; a large elongate black spot in middle of interspace 3 produced outwards and coalescing with the black on the termen. Hind wing: uniform. *Underside*: fore wing white, apex ochraceous yellow; the black markings of the upperside show through by transparency. Hind wing: uniform ochraceous yellow. Antennæ black speckled with white; head, thorax and abdomen above black, beneath white.

Exp. ♂ 54 mm. (2·2″).

Hab. Assam: the Nága Hills; Upper Burma.

This seems to be an extremely rare insect, only two specimens, so far as I know, have been recorded: the type from the Nága Hills in the Indian Museum, and one taken in Upper Burma by Capt. Watson, now in the British Museum.

592. **Pieris deota**, *de Nicéville* (Mancipium), *J. A. S. B.* 1883, p. 82, pl. 9, fig. 10 ♂; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 129, pl. 518, figs. 2, 2 *a*, ♂.
Pieris roborowskii, *Alphéraky*, *Rom. Mém.* iii, 1887, p. 404; *id. l. c.* v, 1889, p. 69, pl. 4, figs. 3 *a*, *b*.

♂ ♀. Closely resembles *P. brassicæ*, from which it differs as follows:— ♂. *Upperside*, fore wing: the inner margin of the black area on apex and termen not smoothly curved but sinuate; an elongate narrow black spot, sometimes faint and ill-defined but always traceable, in interspace 3. Hind wing: termen edged by a narrow continuous black band that extends from the black costal spot to the middle of interspace 3. *Underside*, fore wing: apex and upper portion of termen ashy-brown (by reason of the black on the upperside that shows through by transparency), thickly irrorated with black scales; besides the black spots in interspaces 1 and 3 present as in *P. brassicæ*, there is a third black spot from middle of interspace 5 to vein 7 that extends above the latter vein diffusely to the costa. Hind wing: as in *P. brassicæ* but the ground-colour not so yellow; the black terminal band of the upperside can be seen through faintly by transparency; the black subcostal spot as in *P. brassicæ*, with a second black spot in interspace 3.—♀. *Upperside*: as in ♀ of *P. brassicæ*, but as in the ♂ of its own form, the inner margin of the black area at apex and on termen of fore wing not smoothly curved but sinuate. Hind wing: a black terminal band like that in the ♂ but broader and divided by the white veins into a series of inwardly diffuse subquadrate spots; a small black spot in interspace 3, another in interspace 5, the latter joined to the subcostal black spot which is particularly large and prominent. *Underside*: as in the ♂.

Exp. ♂ ♀ 58–61 mm. (2·28–2·40″).

Hab. N.W. Himalayas: Ladakh, 2500 ft.; Tibet; the Pamirs, 12,300 to 14,200 ft.

593. **Pieris canidia**, *Sparrman* (Papilio), *Amœn. Acad.* vii, 1768, p. 504; *Kirby, Syn. Cat. Di. Lep.* 1871, p. 455; *Elwes, Trans. Ent. Soc.* 1888, p. 415; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 590, pl. 5, fig. 21, pupa; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 133, pl. 520, figs. 1, 1 *a*–1 *h*, ♂ ♀.

Pieris gliciria, *Cramer* (Papilio), *Pap. Exot.* ii, 1779, pl. 171, figs. E, F; *Boisduval, Spec. Gén. Lép.* i, 1836, p. 524; *Kollar in Hügel's Kaschmir*, iv (2), 1844, p. 409.

Pieris napi, *Gray* (*nec Linn.*), *Lep. Ins. Nepal*, 1846, p. 6, pl. 6, fig. 2 ♂.

♂. *Upperside*: white to pale cream-colour. Fore wing: base and basal portion of costa, and base and upper margin of cell irrorated with black scales; apex and terminal margin to about the middle, decreasingly, black, on the latter the black extended for a very short distance triangularly along the veins; a round black spot in interspace 3. Hind wing: a subcostal black spot as in *P. rapæ*, but generally larger and more conspicuous, and a series of four or five terminal black spots that vary in size at the apices of the veins. *Underside*: fore wing white; cell and costa lightly irrorated with black scales; apex somewhat broadly tinged with ochraceous yellow; interspaces 1, 3 and 5 with conspicuous subquadrate black spots, the spot in interspace 1 sometimes extended into interspace 1 *a*, that in 5 ill-defined. Hind wing: from pale, almost white, to dark ochraceous, thickly irrorated all over (with the exception of a longitudinal streak in the cell, and in the darker specimens similar longitudinal streaks in the interspaces) with black scales; costa above vein 8 chrome-yellow. Antennæ black with minute white specks; the long hairs on head and thorax greenish-grey; abdomen black; beneath: head, thorax and abdomen white.—♀. *Upperside*: similar to that of the ♂ but the irroration of black scales more extended and prominent, the black on the apex and termen of the fore wing and the black spots on the termen of the hind wing broader, more extended inwards; on the fore wing there is an additional spot in interspace 1, and both this and the spot in interspace 3 in many specimens are connected by a line of black scales along the veins to the outer black border; also the spot in interspace 1 often extends across vein 1 into the interspace below. *Underside*: similar to that in the ♂.

Exp. ♂ ♀ 42–60 mm. (1·66–2·36").

Hab. The Himalayas from Chitral and Kashmir to Sikhim and Bhutan, from 2000 to 11,000 ft. elevation; the hills of Southern India; Assam; Upper Burma: the Shan States; extending to China.

Pupa. As represented in Mackinnon's figure is a light ochraceous brown with the wing-cases prominent, and with some tubercular darker brown spines midway on the abdominal side.

594. **Pieris napi,** *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 468.

Race melete.

Pieris melete, *Ménétriés, Cat. Mus. Petr., Lep.* ii, 1857, p. 113, pl. 10, figs. 1, 2, ♂ ♀; *Butler* (Synchloe), *P. Z. S.* 1872, p. 64; *de Nicéville* (Mancipium), *Sikhim Gazetteer*, 1894, p. 168; *Watson, Jour. Bomb. Nat. Hist. Soc.* x, 1897, p. 669; *de N. & Mackinnon, Jour. Bomb. N. H. Soc.* xi, 1898, p. 590.

Pieris ajaka, *Moore, P. Z. S.* 1865, p. 490, pl. 31, fig. 16 ♀; *Doherty* (Ganoris), *J. A. S. B.* 1886, p. 135; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 132, pl. 519, figs. 2, 2 *a*, 2 *b*, 3, 3 *a*, 3 *b*, ♂ ♀.

Race **melete,** Ménétr. *Summer brood.*—♂. *Upperside*: white, veins black, conspicuous. Fore wing: base slightly irrorated with black scales; costal margin very narrowly black; apex black, that colour joined on to three black, inwardly triangular, continuous or coalescent spots at apices of veins 2, 3 and 4; a round black spot in middle of interspace 3, and in many specimens traces of a similar spot in the outer half of interspace 1. Hind wing: with an obliquely placed subcostal spot before the apex. *Underside*: veins more or less widely margined with black; apex of fore and the whole surface of the hind wing somewhat tinged with dull ochraceous, not so yellow as in the typical *P. napi*. In many specimens there is an indication by black scaling of bars between veins 1 and 2 and 3 and 4 respectively; base of costa of hind wing bright yellow. Antennæ dark dull brown, paler at their apices; head, thorax and abdomen black with more or less of white hairs and scaling; beneath: whitish.—♀. Resembles the ♂ in the character of the markings, but is altogether much darker on the upperside; the irroration of black scales at the base of the fore wing spreads up to nearly the apex of the cell and of interspace 1; the black area at apex and on the termen of the same wing is much broader, the

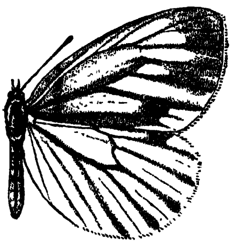

Fig. 44.—*Pieris napi*, race *melete*.

black spots in interspaces 1 and 3 much larger; in the latter interspace, and in very dark specimens from high elevations in the former also, these spots coalesce with the black on the termen; in all specimens the lower spot is continued in a broad streak along the dorsum to the base of the wing. Hind wing: as in the ♂, but the black edging to the veins much broader; in high elevation specimens there is also a good deal of dark shading at base and irroration of black scales on the disc. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂, but slightly darker.

Exp. ♂ ♀ 50–71 mm. (2–2·8″).

Hab. Within our limits: the N.W. Himalayas to Sikhim and Bhutan up to 10,000 feet; the Khasia Hills in Assam; Chin Hills down to the Shan States in Upper Burma. Spread over Northern Asia and China to Japan.

Var. *ajaka*, Moore, is typically the small pale north-west form which, however, grades into typical *melete* from Japan and Amurland. *P. melete* itself scarcely forms a race distinct from the European *P. napi*. Mr. Leech says that the little yellow patch at the base of the hind wing on the underside will almost always separate *P. melete* from any of the forms of *P. napi*. I have, however, seen specimens of the small, lightly marked spring brood of *melete* var. *ajaka* from Gilgit in which this patch is entirely absent.

595. **Pieris chumbiensis**, *de Nicéville* (Parapieris), *J. A. S. B.* 1897, p. 563, pl. 1, fig. 6; *Moore* (Parapieris), *Lep. Ind.* vi, 1904, p. 143, pl. 522, figs. 1, 1 *a*, ♂.

Pieris dubernardi, *Elwes* (*nec Oberthür*), *Trans. Ent. Soc.* 1888, p. 415; *de Nicéville* (Mancipium—*nec Oberthür*), *Sikhim Gazetteer*, 1894, p. 168.

♂. *Upperside*: white. Fore wing: veins black, costal and terminal margins narrowly, apex more broadly, black; the inner margin of the black at apex forms an even curve; a large round black spot in middle of interspace 3, the lower discocellular edged on either side with black and the base of the wing irrorated with black scales. Hind wing: with a dark greyish appearance due to the dark markings of the underside that show through by transparency; veins black; a black costal spot a little before the apex, and the base of the wing heavily irrorated with black scales. *Underside*: fore wing white, veins edged with black scaling, the round black spot in interspace 3 as on the upperside; apex and terminal margin suffused with yellow that decreases posteriorly on the latter. Hind wing: yellow, all the veins very broadly edged with black that gives an appearance of streaks to the ground-colour; precostal area edged with deep cadmium-yellow. Antennæ, head, thorax and abdomen fuscous black.—♀ unknown.

Exp. ♂ 54–58 mm. (2·12–2·28″).

Hab. Chumbi Valley; Sikhim.

596. **Pieris krueperi,** *Staudinger, Wien. ent. Monats.* iv, 1860, p. 19.

Race devta.

Mancipium devta, *de Nicéville, J. A. S. B.* 1883, p. 82, pl. 9, figs. 9, 9 *a*, ♂ ♀; *Moore* (Danaus), *Lep. Ind.* vi, 1904, p. 130, pl. 518, figs. 3, 3 *a*, 3 *b*, ♂ ♀.

Race **devta**, de Nicéville.—♂. *Upperside*: dead white. Fore wing: a narrow band of irrorated black scales along basal portion of costa; a wedge-shaped short costal black spot before the apex; apex black; that colour continued along the anterior portion of the termen as a series of inwardly-pointed triangular coalescent spots at apices of veins 4 and 5; lastly, a large black spot in the outer half of interspace 3. Hind wing: a black costal spot just before the apex, otherwise uniform white. *Underside*: ground-colour similar. Fore wing: black markings similar to those on the upperside, but the black at apex and on termen replaced anteriorly by a dull faint wash of ochraceous or greenish yellow. Hind wing: basal two-thirds irrorated more or less thickly with black scales, with the exception of a short, very broad, inwardly oblique band of the ground-colour, that extends from the middle of the costa to within the upper portion of the discoidal cell; the outer margin of the area irrorated with black scales is transverse from costa to interspace 5, thence curved outwards to vein 4 and obliquely to vein 1 *a*. Antennæ brown, paler at their apices; head fuscous; thorax and abdomen black; beneath: whitish.—♀. *Upperside*: similar to that in the ♂, but the black markings on the fore wing broader, more conspicuous and extended lower along the termen than in the ♂; on the hind wing the black costal spot larger, with in most specimens a well-marked spot also in interspace 3, and in many a series of detached terminal black spots at the apices of the veins. These markings are very prominent in some specimens from Quetta. *Underside*: as in the ♂. Fore wing: the additional black spot in interspace 1 small, the black spot in interspace 3 very large. Hind wing: the terminal series of black spots of the upperside diffuse, more or less continuous or coalescing and washed over with a greenish tint. Antennæ, thorax and abdomen as in the ♂.

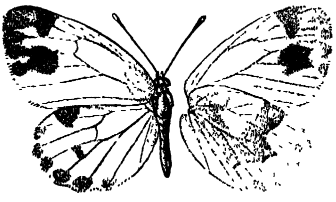
Fig. 45.—*Pieris kreuperi*, race *devta*.

Exp. ♂ ♀ 44–54 mm. (1·72–2·14″).
Hab. Ladakh; Baluchistan; Pishin.

• 597. **Pieris daplidice,** *Linn.* (Papilio) *Syst. Nat.* ed. x, i, 1758, p. 468; *Fabr.* (Pontia) *Illig. Mag.* vi, 1807, p. 283; *Godt. Encycl. Méth.* ix, 1819, p. 128; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 75; *Butler* (Synchloe), *P. Z. S.* 1880, p. 410;

Swinhoe (Synchloe), *Trans. Ent. Soc.* 1885, p. 342; *Moore* (Pontia), *Lep. Ind.* vi, 1904, p. 137, pl. 521, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂. *Upperside*: white. Fore wing: basal half of costa narrowly irrorated with black scales, a broad irregular quadrate black spot over the discocellulars; apex and termen anteriorly, above vein 3 broadly black, with a subterminal series of spots of the ground-colour, prolonged as fine lines to the terminal margin. Hind wing: uniform, the markings on the underside showing faintly through; a costal spot before the apex, and in some specimens, some obscure, anterior terminal markings indicated by irrorated black scaling. *Underside*: white. Fore wing: the form of the markings as on the upperside, but the base of the cell with an irroration of green scales, the black discocellular spot extended to the costa, often washed with green or with a green centre to the black; the apical patch green not black, with the spots of the ground-colour on it ill-defined and obscure; a black or greenish-black spot in the outer half of interspace 1. Hind wing: green; costal margin at base yellow; dorsal margin white; a spot in middle of cell, another above it in interspace 7, a curved irregular discal series of conjoined spots beyond the cell, of which the upper two spots are placed more inwards, and a terminal series of spots in interspaces 1 to 6, white; the veins sometimes faintly yellow. Antennæ dusky-black; head, thorax and abdomen fuscous black; beneath: head, thorax and abdomen white.— ♀. *Upperside*: differs as follows:—Fore wing: a dusky-black streak extends from base along costa and terminates at the black spot on the discocellulars; a transverse, somewhat quadrate black spot in the outer half of interspace 1, with sometimes a short ill-defined black streak below it; the black area on apex and anterior portion of termen broader, the white spots on it blurred and obscure. Hind wing: a large costal black spot before apex; a broad, black, subterminal, inwardly diffuse, curved band in continuation of the same, and a terminal series of clavate black marks that start from the outer margin of the black subterminal band. *Underside*: markings much as in the ♂ but broader. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 52–56 mm. (2·06–2·20″).

Hab. Within our limits: the Western Himalayas; Chitral; Ladakh; Kashmir; Baluchistan. Spread throughout Europe, Asia Minor, Persia and Afghanistan.

598. **Pieris glauconome**, *Klug* (Pontia), *Symb. Phys.* 1829, pl. 7, figs. 18, 19; *Moore* (Pontia), *Lep. Ind.* vi, 1904, p. 139, pl. 521, figs. 2, 2 *a*, 2 *b*, ♂ ♀.

Pieris iranica, *Bienert*, *Lep. Ergeb. Reise Pers.* 1870, p. 27; *Butler* (Synchloe), *P. Z. S.* 1880, p 410, pl. 39, fig. 7, pupa; *Swinhoe* (Synchloe), *Trans. Ent. Soc.* 1885, p. 343.

Pieris vipasa, *Moore*, *P. Z. S.* 1872, p. 565, ♀.

♂. *Upperside*, fore wing: the ground-colour and markings identical with those of *P. daplidice.* Hind wing: ground-colour similar to that of *daplidice*; differs only as follows:—A series of four small black terminal spots at the apices of veins 3 to 6, the anterior 3 joined on the inner side by black loops. *Underside*: similar to that of *daplidice.* Fore wing: differs in the green area at apex and on termen anteriorly, which is broadly traversed by short lines of white that extend to the terminal margin and are faintly lined with yellow. Hind wing: differs in the green coloration which is greatly restricted; the basal area is dusky green with large pyriform spots of the white ground-colour in cell and interspace 7; beyond this there is only a subterminal series of green loops continued along the veins to the margin, this leaves a broad white curved discal band and a series of large white terminal spots in the interspaces; the veins conspicuously lined with yellow. Antennæ ashy brown; head, thorax and abdomen whitish.—♀. *Upper* and *under sides*: similar to those of the ♂, but the markings larger and more clearly defined.

Exp. ♂ ♀ 40–50 mm. (1·58–1·96″).

Hab. Within our limits recorded only from the north-west of India, the Punjab and Baluchistan. Found also in Arabia; Persia; the Pamirs; Egypt and N. Africa.

Larva. Greenish yellow, with two longitudinal yellow bands and five transverse lines of minute black dots on each segment; head yellowish green with black dots.

Pupa. Brown; head with a beak-like curved process; thorax somewhat compressed, with a large tubercle on the ventral side and two smaller posterior tubercles on each side.

599. **Pieris chloridice**, *Hübner* (Papilio), *Eur. Schmett.* i, 1803–1818, figs. 712, 713; *Lang* (Pieris), *Butt. Eur.* 1884, p. 34, pl. 8, fig. 2 ♂; *Butler* (Synchloe), *P. Z. S.* 1872, p. 62; *Moore* (Parapieris), *Lep. Ind.* vi, 1904, p. 142.

♂. *Upperside*: white. Fore wing: discocellulars edged broadly with black on each side; a short broad transverse preapical black bar from costa to vein 6 and another similar short bar further outwards from vein 6 to middle of interspace 4, followed by three outwardly-pointed, somewhat oval, black terminal spots just below the apex. Hind wing: uniform, unmarked. *Underside*: white. Fore wing: the markings as on the upperside, but those at apex green and with a few scattered superposed black scales on the upper preapical bar. Hind wing: basal area green, an oval white spot in middle of cell, a transverse white bar in middle of interspace 7, and the precostal area edged with white above; beyond the cell is a highly sinuous, curved, discal, white band, followed by a complete series of longitudinally rectangular, white, terminal spots, the space between the discal band and the white spots green, this colour continued along the veins that separate the spots up to the termen. Antennæ, head, thorax and abdomen fuscous, the antennæ with pale tips, the thorax with some white hairs;

beneath: head, thorax and abdomen whitish.—♀ differs as follows: *Upperside*, fore wing: the black edging to the discocellulars broader; a curved, postdiscal, irregular, macular, black band, the upper three and lowest spot that compose it large, the spot in interspace 2 small, sometimes subobsolete, the middle two spots of the band coalescent outwardly with the series of terminal black spots, of which there are six (in the ♂ these vary from 3 to 5). Hind wing: an anterior, postdiscal, short, curved, macular, black band, often subobsolete, followed by a more or less complete terminal series of spots at the apices of the veins. *Underside*: as in the ♂; also the antennæ, head, thorax and abdomen.

Exp. ♂ ♀ 40–53 mm. (1·56–2·08″).

Hab. Within our limits, the Himalayas: Chitral and Ladakh.

600. **Pieris callidice**, *Esper* (Papilio), *Schmett.* i, 2, 1800, pl. 115, figs. 2, 3; *Godart, Encycl. Méth.* ix, 1819, p. 129; *de Nicéville* (Parapieris), *J. A. S. B.* 1897, p. 563; *Moore* (Parapieris), *Lep. Ind.* vi, 1904, p. 140, pl. 521, figs. 3, 3 *a*, 3 *b*, ♂ ♀.
Pieris kalora, *Moore, P. Z. S.* 1865, p. 449, pl. 31, fig. 15 ♂.

♂. *Upperside*: white. Fore wing: black at extreme bases of interspaces 1 *a* and 1 and of cell; discocellulars marked with a quadrate black spot; a discal curved series of inwardly dentate spots, the spots in interspaces 1 and 2 generally reduced to a mere trace, often absent; an anterior terminal series of similar but more clearly defined spots at the apices of veins 3 to 7. Hind wing: uniform, the pattern of the underside visible through transparency; base densely irrorated with black scales. *Underside*, fore wing: white; basal half of costal margin and quadrate spot on discocellulars dull black; a discal curved series of four black spots in interspaces 1, 3, 5 and 6, followed by elongate streaks of green along veins 3 to 7 that extend to the termen. Hind wing: green, an elongate oval yellowish-white spot in cell, followed beyond by complete curved series of discal and terminal yellowish-white, inwardly lanceolate spots. Antennæ black, spotted with white, head fuscous grey, thorax blackish grey, abdomen black with more or less sparse white scaling; beneath: head, thorax and abdomen white.—♀. *Upperside*: similar to that of the ♂, the black scaling at the base of the wings more extended, especially on the hind wing where it stretches broadly down the dorsal half of the wing and occupies also the apex of the cell. Fore wing: the irroration of black scales along the basal half of the costal margin and the discocellular quadrate black spot as in the ♂, the latter, however, broader; the apex and terminal third of the wing above vein 2 dusky black, with a series of elongate white spots in the interspaces, the inner margin of the black area curved but very jagged; lastly, a geminate transverse black spot in the outer half of interspace 1. Hind wing: a terminal series of large, inwardly acutely pointed, black spots with oval white centres and a large costal black spot before the apex.

Underside, fore wing: the ground-colour and markings much as in the ♂, but the green on the apex and termen more extended, the white streaks that traverse it longer; the black discal spots in interspaces 5 and 6 absent. Hind wing: similar to that of the ♂, but the yellowish-white lanceolate spots narrower and smaller. Antennæ, head, thorax and abdomen as in the ♂. In both sexes the antennæ are not generically typical, the club abrupt, shorter and broader.

Exp. ♂ ♀ 53–60 mm. (2·10-2·35″).

Hab. Within our limits: N.W. Himalayas above 12,000 feet from Chitral to Mussoorie. Occurs also in the higher mountains of Europe; in Asia from the Altai to the Himalayas; and in China.

Genus **SYNCHLOE**.

Synchloe, *Hübner, Verz. bek. Schmett.* 1816, p. 94.
Euchloe, *Hübner, t. c.* p. 94.
Anthocharis, pt., *Boisduval, Sp. Gén. Lép.* i, 1836, p. 556.

Type, *S. belemia*, Esper, from N. Africa.

Range. Northern Europe, Asia and America; North Africa; India, in the Western Himalayas and the lower hills of the Punjab.

♂ ♀. Fore wing: costa very slightly arched, nearly straight; apex blunt; termen oblique, short; tornus obtuse; dorsum long, straight, more than three-fourths the length of the costa; cell about half length of wing; upper discocellular very short, middle long, strongly concave, lower bent acutely inwards at origin of vein 5; veins 5 and 6 from the discocellulars; all the veins present *. Hind wing: long; costa arched, bluntly angulate in the middle; termen short, slightly convex; tornus typically distinctly angulate, though the angle is not so clearly defined in the Indian forms; dorsum straight from tornus (in the Indian forms convex), then strongly concave near base; cell broad; lower discocellular the longest, middle discocellular short; precostal spur or vein curved inwards. Antennæ short, less than half length of fore wing; club abrupt, broad and flat; palpi slender, third joint short; head and palpi very hairy in front.

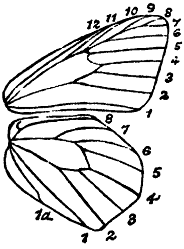

Fig. 46.
Synchloe, venation.

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* In *S. daphalis*, Moore, one of the two forms of this genus found within our limits, vein 8 in the fore wing is lost. But all evidence of coloration and habits &c. points to the fact that *S. daphalis* is merely a race of *S. belia*, Linn. (*ansonia*, Esper), the fore wing of which has all the veins present.

Key to the forms of Synchloe.

a. Upperside fore and hind wings: ♂ rich lemon-yellow, ♀ pale sulphur-yellow; hind wing: underside irrorated with black scales ...... *S. lucilla*, p. 180.
b. Upperside fore and hind wings: ♂ ♀ white; hind wing: underside white, markings green *S. belia*, race *daphalis*, [p. 180.

601. **Synchloe lucilla**, *Butler* (Euchloe), *P. Z. S.* 1886, p. 376, pl. 35, fig. 4; *Baker* (Anthocharis), *Trans. Ent. Soc.* 1889, p. 525.

♂. *Upperside*: lemon-yellow; base of wings irrorated with black scales. Fore wing: discocellulars with a broad, short, transversely oblique bar that does not extend to the costal margin, apex from about the apical third of the costa in a curve (angulate in the middle) to the tornus, black, traversed obliquely by a more or less obscure maculate narrow band of the ground-colour; cilia yellow alternated with black. Hind wing: uniform, immaculate. *Underside*: duller paler yellow. Fore wing: the black discocellular mark shorter, the apical black area of the upperside showing through by transparency and irrorated with minute black scales, often an obscure pink line along the costal and terminal margins; the costa towards apex with a series of small white spots, each spot inwardly defined by a minute black dot. Hind wing: densely irrorated with black scales; a small white discocellular spot and a series of white transverse spots along the costal margin as in the fore wing, but more distinct. Antennæ yellowish brown, head fuscous, collar pinkish, thorax fuscous, abdomen black on the sides and yellow beneath.—♀. *Upperside*: very pale sulphur-yellow. Fore wing: black, markings as in the ♂ but the discocellular bar broader and longer; the preapical maculate band of the ground-colour in the black area more distinct. Hind wing: uniform, immaculate. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 33–42 mm. (1·30–1·66″).

Hab. The Punjab: Campbellpore; Attock; Khairabad.

A very interesting and instructive paper, by Mr. G. T. Baker, on the distribution of the group of forms of the genus *Synchloe* (=*Anthocharis*) which includes *lucilla* is published in the Trans. Ent. Soc. for 1889, p. 523 *et seq.*

602. **Synchloe belia**, *Linn.* (Papilio) *Syst. Nat.* xii, ed. 1767, p. 761.

Race daphalis.

Synchloe daphalis, *Moore* (Anthocharis), *P. Z. S.* 1865, p. 491, pl. 31, fig. 14 ♂.
Euchloe venosa, *Butler*, *P. Z. S.* 1880, p. 151, pl. 15, fig. 5 ♂.

Race **daphalis**, Moore.—♂. *Upperside*: white; base of wings irrorated with black scales. Fore wing: basal half of costa spotted with black, a lunate black discocellular spot and an inner and an outer sinuous black, preapical, oblique band. Hind wing: uniform, immaculate, but the pattern of the underside shows through by transparency. *Underside*, fore wing: creamy white, costa spotted with minute black dots; discocellular, lunate, black spot centred with white; apex checkered with dark brown, the brown overlaid with greenish-yellow scales, the interspaces silvery. Hind wing: irregular, more or less transverse bands and lines of dark brown overlaid with greenish-yellow scales, the interspaces shining silvery white. Antennæ white, head and thorax dark fuscous grey, abdomen white; beneath: head, thorax and abdomen white.—♀. Differs from the ♂ only in the apex of the fore wing, which is more rounded.

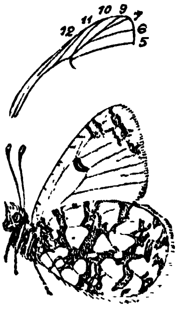


Fig. 47. *Synchloe belia*, race *daphalis*.

Exp. ♂ ♀ 34–46 mm. (1·34–1·82″).

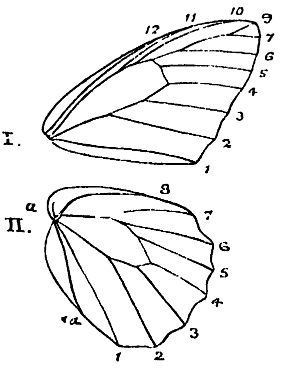
Hab. Within our limits, the Western Himalayas: Chitral; Kunawur, Goorais Valley; the Punjab: Attock bridge, Khairabad.

Genus **HUPHINA**.

Huphina, *Moore, Lep. Ceyl.* i, 1881, p. 136; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 494.

Type, *H. coronis*, Cramer = *H. nerissa*, Fabr., from India.

Range. India, south of the lower ranges of the Himalayas; Ceylon; the Andamans; Nicobars; Assam; Burma; Siam; Malayan Peninsula, and all the islands of the Malayan Subregion down to Australia and New Caledonia.



•Fig. 48.—*Huphina*, venation.

♂ ♀. Fore wing: costa arched, more strongly so than in *Appias*, apex blunt; termen straight; tornus rounded; dorsum straight, about three-fourths the length of the costa; cell typically slightly longer (in some forms slightly shorter) than half length of fore wing; vein 6 given off from lower side of 7 well beyond apex of cell, upper discocellular therefore absent; middle discocellular concave, not much shorter than the lower; lower slightly concave, oblique, more or less attenuated anteriorly; vein 8 absent, 9 from base of apical fourth of 7, 10 and 11 free, from upper half of subcostal. Hind wing: short and broad; costa arched; apex broadly rounded; termen very slightly convex; tornus strongly curved, obtuse; dorsum slightly convex; cell elongate; discocellulars very oblique; precostal spur or vein stout, simple, inclined obliquely outwards. Antennæ slender, less than half length of fore wing, club very gradual; palpi subporrect, basal joints fringed anteriorly with slender hairs, third joint stout, closely scaled, acute; body moderately stout.

Key to the forms of Huphina.

A. ♂ ♀. Upperside hind wing: broadly orange at tornal angle .... *H. lea*, p. 182

B. ♂ ♀. Upperside hind wing: not broadly orange at tornal angle, more or less concolorous with rest of wing.

- *a*. Underside hind wing: veins more or less broadly bordered or dilated with dusky black.
  - *a'*. Underside hind wing: ground-colour of greater extent than the dilated veins .... *H. nerissa*, p. 183.
  - *b'*. Underside hind wing: ground-colour of less extent than the dilated veins .... *H. nerissa*, race *lichenosa*, [p. 187.
- *b*. Underside hind wing: veins not bordered or dilated with dusky black.
  - *a'*. Underside hind wing: a broad white streak or streak paler than ground-colour, occupies greater portion of cell .... *H. nadina* (typical), p. 188.
  - *b'*. Underside hind wing: a large whitish spot or spot paler than ground-colour, occupies only apex of cell .... *H. nadina*, race *andamana*, [p. 190.
  - *c'*. Underside hind wing: ground-colour uniform, no spot or streak of other colour in cell .... *H. nadina*, race *remba*, [p. 190.

603. **Huphina lea** (Pl. XVII, fig. 116), *Doubleday* (Pieris), *A. M. N. H.* (2) xvii, 1846, p. 23; *Moore* (Pieris), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 77; *Moore, Lep. Ind.* vi, 1904, p. 213, pl. 545, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

♂. *Upperside*: white. Fore wing: base, the costal, subcostal and median veins slightly irrorated with black scaling; apical half of costal margin increasingly to apex and thence decreasingly to tornus jet-black, the inner margin of the black diffuse and slightly produced along the veins. Hind wing: termen narrowly jet-black; tornal area broadly bright orange, succeeded along the dorsal area below the cell by canary-yellow; the inner margin of the black on the termen slightly bluish owing to the markings of the underside which show through. *Underside*, fore wing: white; the basal third of costa and broad lines that border the subcostal and median nervures on their inner sides dusky black; apex of wing beyond cell and above vein 4, and a band below vein 4 on posterior portion of termen, rich brownish black; two elongate white spots just beyond the apex of the cell, and a yellowish elongate spot above them, followed by two bright yellow preapical spots; lastly, short, transverse, lunular, brown bars between veins 2 and 3 and 3 and 4, so extended along the veins as to coalesce with the black on the termen. Hind wing: canary-yellow; termen with a broad band of rich brownish black, superposed on which are a yellow spot near apex of interspace 7, and orange-coloured ill-defined subterminal lunules in interspaces 2 and 3, that are continued below interspace 3 to the tornus and a little way up the dorsum in a broad band of orange. Antennæ black; head clothed with greenish, thorax with bluish-grey, longish hairs; abdomen dusky greenish-white above, purer white below. -- ♀. Similar, but both upper and under sides differ in the greater extent of black on apex and termen. On the upperside of the fore wing the subcostal and median veins are broadly bordered internally with dusky black, the black on the apex reaches the apex of the cell and encloses three elongate white spots just beyond the latter, while the black along the termen encloses a white subterminal spot in interspace 1 and another in interspace 4; in interspace 2 its inner margin is deeply indented. Hind wing: the canary-yellow above the orange tornal area of greater extent, suffusing the whole of the cell. *Underside*: differs from that of the ♂ in the fore wing, by the presence of three, not two, preapical yellow spots, and the subterminal black bar continued across interspace 1; further, on the hind wing there are three subapical yellow spots. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 54–64 mm. (2·12–2·52").

Hab. Lower Burma as far north as Taungoo; Tenasserim; Siam; the Malay Peninsula; Sumatra; Banka; Borneo.

604. **Huphina nerissa**, *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 471; *Moore* (Pieris), *Cat. Mus. E. I. C.* i, 1857, p. 72; *Doherty* (Huphina), *J. A. S. B.* 1886, p. 135; *Mackinnon & de N.* (Huphina) *Jour. Bomb. N. H. Soc.* xi, 1898, p. 590.

Papilio phryne, *Fabr. Syst. Ent.* 1775, p. 473; *Moore* (Huphina), *Lep. Ceyl.* i, 1881, p. 136, pl. 53, figs. 1, 1 *a*, 1 *b*, ♂ ♀, larva & pupa; *Watson* (Huphina), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 494, pl. 1, figs. 7–12, ♂ ♀; *Dixey* (Huphina), *Trans. Ent. Soc.* 1894, pp. 257, 277; *Davidson, Bell & Aitken* (Huphina), *Jour. Bomb. N. H. Soc.* x, 1897, p. 574.

Papilio amasene, *Cramer, Pap. Exot.* i, 1776, pl. 44, fig. A ♂.

Papilio coronis, *Cramer, Pap. Exot.* i, 1776, pl. 44, figs. B, C, ♀;

Moore (Huphina), *Lep. Ind.* vi, 1904, p. 207, pl. 543, figs. 1, 1 *a*–1 *h*, 2, 2 *a*–2 *d*, ♂ ♀.
Papilio evagete et zeuxippe, *Cramer, Pap. Exot.* iii, 1780, pl. 221, figs. F, G, & iv, 1782, pl. 362, figs. E, F, ♀.
Papilio cassida, *Fabr. Ent. Syst. Suppl.* 1798, p. 427; *Swinhoe* (Huphina), *P. Z. S.* 1885, p. 137.
Pieris hira, *Moore, P. Z. S.* 1865, p. 490, pl. 31, fig. 17 ♂; *Rothney* (Huphina), *Ent. Month. Mag.* xix, 1882, p. 35.
Pieris copia, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 340; *Moore* (Huphina), *Lep. Ind.* vi, 1904, p. 211, pl. 544, figs. 1, 1 *a*–*h*, ♂ ♀.
Appias dapha, *Moore, P. Z. S.* 1878, p. 838; *Elwes & de N.* (Huphina) *J. A. S. B.* 1886, p. 432; *Watson* (Huphina), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 495, pl. 1, figs. 1–6, ♂ ♀.
Huphina pallida, *Swinhoe, P. Z. S.* 1885, p. 137.

Race lichenosa.

Pieris lichenosa, *Moore, P. Z. S.* 1877, p. 591; *Watson* (Huphina), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 495; *Moore* (Huphina), *Lep. Ind.* vi, 1904, p. 212, pl. 544, figs. 2, 2 *a*, 2 *b*, ♂ ♀.

Wet-season brood.—♂. *Upperside*: white, a greyish-blue shade at base of wings and along the veins, due to the dark markings on the underside that show through. Fore wing: veins black; apex and termen black, the inner margin of that colour extended in an irregular curve from middle of costa to base of terminal third of vein 4, thence continued obliquely outwards to the tornal angle; interspaces 6 and 9 with short narrow greyish-white streaks of the ground-colour that stretch into the black apical area but do not reach the margin; a short black subterminal bar between veins 3 and 4 and another, less clearly defined, between veins 1 and 2. Hind wing: veins 4 to 7 with outwardly-dilated broad black edgings that coalesce sometimes and form an anterior, irregular, black, terminal margin to the wing. *Underside*, fore wing: white, the veins broadly margined on both sides by dusky black; costal margin broadly and apex suffused with yellow; subterminal black bars between veins 1 and 2, and 3 and 4 as on the upperside but less clearly defined. Hind wing entirely suffused with yellow, the veins diffusely bordered with black; a

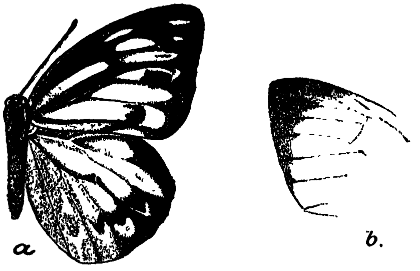


Fig. 49.—*a. Huphina nerissa.* *b.* Apical half, upperside fore wing: var. *dapha*.

more or less incomplete, subterminal series of dusky spots in interspaces 1 to 6; more often than not the spot in 5 entirely absent; a conspicuous chrome-yellow spot on the precostal area. Antennæ black, obscurely speckled with white; head and thorax bluish grey; abdomen dusky black; beneath: the palpi and abdomen white, the thorax yellow.—♀. Similar to the ♂ but very much darker. *Upperside*: veins more broadly bordered with black; in many specimens only the following portions of the white ground-colour are apparent:—Fore wing: a broad streak in cell and beyond it a discal series of streaks in interspaces 1 to 6, 9 and 10; the streaks in interspaces 1 and 3 very broadly interrupted by the transverse black bars; that in 6 more or less obsolescent. Hind wing: a broad streak in cell, a discal series of streaks in interspaces 2 to 7, and a posterior more or less obsolescent subterminal series of greyish-white double spots. *Underside*: similar to that of the ♂, only the veins much more broadly margined with diffuse black scaling. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.—♂ ♀ differ from the wet-season brood as follows:—♂. *Upperside*, fore wing: the apical and terminal black areas much restricted; veins concolorous; black subterminal bars less clearly defined; the lower one often obsolete. Hind wing: the black markings on the termen represented by short triangular irrorations of black scales at the apices chiefly of the anterior veins. *Underside*: as in the wet-season specimens, but the yellow much paler and somewhat ochraceous in tint.—♀. Differs less from the wet-season ♀, but the black markings on both the upper and under side are narrower and less pronounced, and on the latter the yellow suffusion is paler and ochraceous in tint.

Exp. ♂ ♀ 64–76 mm. (2·06–3·00").

Hab. Nepal; Sikhim; Bhutan; Bengal; Assam; Upper and Lower Burma; Tenasserim. Found also in Siam and China.

Var. *phryne*, Fabr.—Can be distinguished from the typical form as follows:—♂ ♀. Invariably smaller. *Wet-season brood.*—*Upperside* fore wing: in addition to the subterminal black bars between veins 1 and 2, and 3 and 4 another black bar above vein 5, that joins on to the black on the apex and completely isolates the short, narrow, preapical streaks of the ground-colour, that in the typical form are merely continuations of the colour at the bases of the interspaces in which the streaks lie. *Underside*: the above noted black marking or bars very conspicuous, especially between veins 5 and 6. Hind wing: the subterminal transverse series of dusky spots in the interspaces replaced by a nearly continuous, prominent, dusky black band, interrupted only in interspace 5.

Dry-season brood.—♂ ♀. *Upperside*, fore wing: the black on apex and termen much restricted, the lower subterminal black bar generally absent; the veins white, concolorous with the ground-colour, so that the bar between veins 3 and 4 does not coalesce with the black on the termen. In the extreme dry-weather broods this bar becomes obsolete. Hind wing: uniform dead white, sometimes the apices of one or two of the anterior veins with a little black scaling. *Underside*: the veins, except those that limit the cell of the fore wing, not bordered with black; the suffusion of yellow along costal margin, on apex of fore wing, and over the whole surface of the hind wing pale yellow, with a tendency in the extreme dry-season specimens to get almost white; on the fore wing the black transverse subterminal bars between veins 1 and 2 and 3 and 4 are sometimes indicated by mere diffuse small patches of scales; at other times they are absent. Antennæ, head, thorax and abdomen in both seasonal broods much as in the typical form, but paler.

Exp. ♂ ♀ 44–56 mm. (1·73–2·23″).

Hab. The N.W. Himalayas up to 4000 ft.; Nepal; Sikhim; Bhutan; Bengal; Central, Western and Southern India; Ceylon.

Larva. "Cylindrical, tapering at the anal end; finely white-dotted, with a lower lateral white line. Feeds on *Capparis*." (*Thwaites*.)

Pupa. "Greenish; thorax and basal abdominal segment acutely angled." (*de Nicéville MS.*)

Var. *dapha* *, Moore, differs very little from the typical form, and the differences seem constant only in the wet-season brood. Specimens of the dry-season brood approximate much more closely to the typical form.

Wet-season brood.—♂. *Upperside*: almost as in *nerissa* ♂, but in many specimens the greyish-white preapical streaks on fore wing in continuation of the ground-colour of the wing are entirely absent, the apex wholly black; the subterminal black bar between veins 1 and 2 most often obsolete. Hind wing: as in *nerissa*. *Underside*: as in *nerissa*, but the suffusion of yellow confined to the basal half of the costal margin of the fore wing rarely extended to the apex, while on the hind wing it spreads only over the basal half of the wing. On the fore wing the subterminal black bar between veins 1 and 2 is absent or sometimes barely indicated by a little diffuse black scaling. Hind wing: a series of internervular outer slender black streaks confined generally to the posterior portion of the wing. Antennæ, head, thorax and abdomen as in the typical form.—♀ differs from the ♀ of *nerissa* on the *upperside* in the black margins to the veins on both fore and hind wings, which are much narrower and leave a very much greater extent of the white ground-colour apparent. On the underside it can be recognized at once, as the suffusion of yellow on both fore and hind wings is restricted just as it is in the ♂; the apex of the fore wing, however, is also tinged with yellow. Antennæ, head, thorax and abdomen as in the ♂.

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* The *Pieris copia* of Wallace has been generally considered to represent the wet-season form, *Appias dapha* the dry-season form. The types of both are now in the British Museum. The former is labelled "Bengal," and is identical with specimens of true *nerissa* from Sikhim; the latter "Moulmein," and, judging from its size and the colour of the underside of the hind wing, I think it is undoubtedly the ♂ (dry-season brood) of the variety of *nerissa* peculiar to Burma.

Dry-season brood.— ♂ ♀. Very similar to specimens of the dry-season brood of *nerissa*, but always smaller. So far as the markings go, both on the upper and under sides, it is so similar that size alone is the criterion.

Exp. ♂ ♀ 52–63 mm. (2·02–2·48").

Hab. Recorded, so far as I know, only from Burma.

Race **lichenosa**, Moore.— ♂. *Upperside*: white. Fore wing: basal half of costal margin tinged with greenish yellow and irrorated sparsely with black scales; apical third of the wing obliquely from the costa to the tornal angle jet-black, the inner margin of this irregular and more or less sinuous; an obscure whitish subterminal spot on the black area in interspace 3; vein 4 and the lower discocellular sometimes slightly marked with black scales, the rest of the veins on the basal two-thirds of the wings more or less of the same tint as the ground-colour. Hind wing: terminal margin anteriorly black, the terminal portion of the anterior veins very finely black. *Underside*: white. Fore wing: the costal margin very broadly and the apex suffused with greenish yellow; median vein on the inner side broadly bordered with dusky-black, continued along the basal half of vein 4 and then transversely downwards as a black band, diffuse below vein 3. Hind wing: so densely suffused with greenish yellow as to leave only obscure elongate spots of the ground-colour apparent in the anterior interspaces; the whole surface of the wing more or less closely irrorated with black scales. Antennæ black, speckled with white on their inner side; head and thorax with long greenish hairs; abdomen greenish white; beneath: the palpi and abdomen white, the long hairs on the former tipped with black; thorax greenish yellow.— ♀. Similar to the ♂ both on the upper and undersides, but darker owing to the broad dusky-black border to the veins on both the upper and under sides. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 60–70 mm. (2·35–2·78").

Hab. Andamans.

Leaving *lichenosa* out as a fairly well marked and distinct insular race, very constant in its markings, *H. nerissa* and its varieties are most puzzling forms. I have examined the genitalia of typical males of *nerissa*, *phryne* and *dapha*, and they seem to be identical. I am not certain, however, whether the test of identity in the shape and structure of the male genitalia is an entirely reliable one. Provisionally I have placed *phryne* and *dapha* as varieties of *nerissa*, till careful breeding experiments can determine whether the above three are mere varieties, one of the other, or distinct forms, for their distribution is peculiar. *H. phryne*, for instance occurs with *H. nerissa* in Nepal, Sikhim, and Bhutan, but elsewhere in its range it is the representative form where typical *nerissa* does not occur. Again as to *dapha*, though specimens of the dry-season brood are almost identical in markings with specimens of the dry-season brood of *nerissa*, the wet-season forms of *dapha* are peculiarly coloured and occur only in Burma, from whence wet- and dry-season forms of *nerissa* have also been recorded.

605. **Huphina nadina**, *Lucas* (Pieris), *Rev. et Mag. Zool.* (2) iv, 1852, p. 333; *de Nicéville* (Huphina), *Gazetteer of Sikhim*, 1894, p. 168; *Moore* (Huphina), *Lep. Ind.* vi, 1904, p. 214, pl. 545, figs. 2, 2 *a*–2 *e*, ♂ ♀.
Pieris nama, *Moore*, *Cat. Lep. Mus. E. I. C.* i, 1857, p. 76, ♂ ♀; *Watson* (Huphina), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 495, pl. 2, figs. 6, 7; *Swinhoe* (Huphina), *Trans. Ent. Soc.* 1893, p. 309.
Pieris amba, *Wallace*, *Trans. Ent. Soc.* (3) iv, 1867, p. 340, ♂; *Swinhoe* (Huphina), *Trans. Ent. Soc.* 1893, p. 309.
Appias amboides, *Moore*, *J. A. S. B.* 1884, p. 46, ♂.

Race andamana.

Huphina nama, *var.* andamana, *Swinhoe*, *P. Z. S.* 1889, p. 398.
Huphina andamana, *Moore*, *Lep. Ind.* vi, 1904, p. 217, pl. 546, figs. 1, 1 *a*, 1 *b*, ♂ ♀.

Race remba.

Pieris remba, *Moore*, *Cat. Lep. Mus. E. I. C.* i, 1857, p. 75, ♂; *id.* (Huphina) *Lep. Ceyl.* i, 1881, p. 137, pl. 53, figs. 2, 2 *a*, ♂; *Hampson* (Huphina), *J. A. S. B.* 1888, p. 363; *Watson* (Huphina), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 496; *Davidson, Bell & Aitken* (Huphina), *Jour. Bomb. N. H. Soc.* x, 1897, p. 575; *Moore* (Huphina), *Lep. Ind.* vi, 1904, p. 217, pl. 546, figs. 2, 2 *a*–2 *e*, ♂ ♀.
Huphina liquida, *Swinhoe*, *A. M. N. H.* (6) v, 1890, p. 361.
Huphina cingala, *Moore*, *Lep. Ind.* vi, 1904, p. 219, pl. 546, figs. 3, 3 *a*, 3 *b*, ♂.

Wet-season brood.—♂. *Upperside*: white. Fore wing: basal half of costal margin suffused with greenish yellow and irrorated sparsely with black scales; apex from the middle of the costa and termen black, the inner margin of the black arched and acutely produced inwards along the veins, the black on the termen narrowed posteriorly and in interspaces 1 *a* and 1 reduced to a mere thread. Hind wing: terminal margin with a broad dark band, due to the markings of the underside that show through by transparency, the darkness accentuated by a slight irroration of black scales; apices of some of the anterior veins black, in some specimens these are dilated and form a narrow anterior black border. *Underside*: white. Fore wing: costal margin and apex very broadly suffused with greenish yellow and irrorated more or less densely with black scales, these latter form also diffuse subterminal patches on the white ground-colour in interspaces 3 and 4; a preapical oblique short band bright yellow, its margins ill-defined; in interspaces 1 to 3 the black terminal markings on the upperside show through as a greyish-blue shade. Hind wing: suffused with greenish-yellow that leaves only a broad streak in the cell (continued beyond in interspaces 4 and 5) of the white ground-colour apparent; the whole surface of the wing more or less densely irrorated with black scales, these have a tendency to form a broad lower obscure discal dark patch and a broad terminal margin, the space between these two bright yellow; a spot of bright yellow also in interspace 6. Antennæ black; the head and thorax anteriorly with long greenish hairs, thorax posteriorly with greyish-blue pile; abdomen black with short white hair-like scales; beneath: the palpi with blackish hairs, the thorax yellow, abdomen white.— ♀. *Upperside*, fore wing: dark brownish black; an oval, elongate, broad streak in cell, continued beyond into the base of interspace 4, broad streaks outwardly ill-defined from bases of interspaces 2 and 3, a large subterminal spot in interspace 1 and a pretornal short streak along the dorsal margin, white. The amount of white marking is variable in some specimens, nearly the whole of the cell and the greater portion of the basal area of interspace 1 are sometimes also white. Hind wing: dark brownish black fading to dusky brownish white posteriorly; cell, basal half of interspace 4 and an elongate, broad, outwardly pointed streak in interspace 5 white. *Underside*: similar to that of the ♂, but the white area on the fore wing more restricted and of a purplish tint, the dusky-black shading on the disc that borders the green on the apical area broader, and the greater portion of interspaces 1 *a* and 1 also shaded with dusky purplish-black. Hind wing: darker than in the ♂, the veins more prominently bordered with black scaling, the posterior, discal, ill-defined, dark band or patch broader and more conspicuous. Antennæ, head, thorax and abdomen purplish brown, the thorax with some long greyish hairs; beneath: the palpi and thorax greenish yellow, abdomen whitish.

Dry-season brood.— ♂. *Upperside*: similar to the upperside in the wet-season brood, but the black on the apex and termen of the fore wing not nearly so broad, on the latter often not reaching vein 1; on the hind wing the black is reduced to a sparse powdering of black scales along the termen. *Underside*: similar to that of the wet-season brood but the greenish-yellow suffusion replaced entirely by ochraceous brown; on the hind wing the white markings of the wet-season form replaced by a paler ochraceous shade than on the rest of the wing; the veins all broadly bordered with irrorated black scaling; the discal obscure transverse band more or less as in specimens of the wet-season brood, but often obsolescent. Antennæ black, head and thorax anteriorly ochraceous brown, thorax medially and posteriorly with long bluish-grey pile, abdomen black with short white hair-like scaling; beneath: the palpi ochraceous with some black hairs, thorax ochraceous brown, abdomen white.—♀. *Upper* and *under sides*: very similar to those of the wet-season ♀, but the blackish-brown colouring on the upperside paler and duller in tint. *Underside*: differs in the yellowish-green suffusion on both fore and hind wings, which is replaced by ochraceous brown. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 58–74 mm. (2·28–2·92″).

Hab. N.E. India: Sikhim; Bhutan; Assam: Silhet; the Khasia Hills; Manipur: Upper and Lower Burma; the Shan States; Tenasserim.

Race **andamana**, Swinhoe. — A slightly differentiated but, because insular, very constant form. The ♂ may be discriminated from the wet-season form of typical *nadina* as follows: on the upperside by the greater extent of the black on the apex and termen of the fore wing; on the underside of the same wing, by the width and prominence of the black inner border to the greenish-yellow area on the apex; on the hind wing by the reduction of the white markings to a large yellowish-white spot on the discocellulars, also by the greater prominence of the broad dark discal band. These differences seem constant. The ♀ is a much lighter coloured insect on the upperside than the ♀ of typical *nadina*. In fact it closely resembles its own ♂, but differs as follows:—*Upperside*: base broadly of both fore and hind wings and the greater portion of the latter wing also, posteriorly dusky-grey and irrorated with black scales; black on apex and termen of fore wing more extended; it commences on the costa above and reaches the upper apex of the cell. On the hind wing the anterior veins are broadly black-margined towards their apices, where they form an irregular anterior black terminal band. *Underside*: *precisely* as in the ♂.

Exp. ♂ ♀ 64–73 mm. (2·52-2·88″).

Hab. The Andamans.

There seems to be no dry-season form corresponding to that in typical *nadina*, but certain specimens taken in March and April have the black on the upperside of the fore wing much restricted.

Race **remba**, Moore.—*Wet-season brood.*—♂ ♀. Resembles the wet-season brood of typical *nadina*, from which it differs as follows: —♂. *Upperside*: ground-colour similar. Fore wing: outer half from the middle of the costa obliquely, to before the tornal angle, intense black, the base with a bluish shade. Hind wing: base, terminal margin broadly below vein 5 and costal margin above vein 6, irrorated with black scales; termen anteriorly from apex to vein 4 decreasingly black. *Underside*: white, costal margin and apex broadly suffused with greenish yellow; a large prominent bright yellow preapical spot, below which is a larger black irregular patch angulated at and touching the lower apex of the cell. Hind wing: greenish yellow, the veins black; a dense irroration of black scales across the middle of the wing, its interior margin sharply defined and extended from costa through the cell to vein 1; the lower discal and tornal areas less densely covered with the irrorated black scaling: a bright, greenish-yellow, irregular spot in middle of interspace 6. Antennæ dark brown, head and thorax anteriorly with greenish-yellow pile; thorax medially and posteriorly with long bluish-grey hairs; abdomen black; beneath: palpi and thorax yellow, abdomen white.— ♀. *Upperside*: dark brownish black. Fore wing: base of cell and upper basal half of interspace 1 white densely irrorated with black scales; the apical half of cell, base of interspace 3, basal two-thirds of interspace 2, a subterminal large round spot in interspace 1 and a pretornal short stripe on the dorsum, white. Hind wing: a more or less triangular, central area white, its lower margin abruptly transverse, its base and posterior half irrorated with black scales. *Underside*: much as in the ♂, but on the fore wing the dusky purplish-black patch below the preapical yellow spot larger and more prominent. On the hind wing the dark irregular discal area also more prominent. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.— ♂. *Upperside*: similar to that of the ♂ of the wet-season brood, but the black area on the fore wing much restricted so that it occupies little more than the apical third instead of the apical half of the wing. On the hind wing the anterior terminal black edging much narrower. *Underside*, fore wing: white; costal margin and apex broadly dull ochraceous with a yellow tint, this colour on the apex margined on its inner side by an irregular dusky, blackish, subtriangular patch. Hind wing: dull ochraceous with a yellow tint as on the costa and apex of fore wing; an irregular transverse dusky discal band, that does not reach the costa or the dorsum, somewhat sparsely irrorated with black scales.— ♀. Similar to the ♂ but darker, the black markings on both fore and hind wings on the upperside similar but slightly broader: on the underside all the markings paler and duller than in the ♂.

Exp. ♂ ♀ 52-62 mm. (2·05-2·44").

Hab. Southern India; Ceylon.

This is more or less a variable insect. Ceylon specimens differ in the relative width of the black markings and in the general paleness and dull tint of the greenish yellow on the underside; these Moore has separated off as *cingala*.

Larva and *pupa* are said to be "scarcely distinguishable from those of the last species [i. e. *phryne*] and [the former?] feeds on the same plants." (*Davidson, Bell & Aitken.*)

Genus **IXIAS**.

Ixias, *Hübner, Verz. bek. Schmett.* 1816, p. 95.
Thestias, *Boisduval, Spec. Gén. Lép.* i, 1836, p. 590.

Type, *I. pyrene*, Linn., from India and China.
Range. Indo-Malayan Region and China.

♂ ♀. Fore wing: costa regularly arched; apex rounded or obtuse; termen straight; tornus rounded; dorsum very slightly sinuous; cell comparatively broad, about half length of wing; upper discocellular absent, middle and lower concave, the former much shorter than the latter, vein 5 therefore closer to 7 than to 4; vein 6 from lower side of 7, beyond apex of cell; vein 8 absent; vein 9 from apical third of 7; veins 10 and 11 free, from apical half of subcostal vein, 10 equidistant from apex of cell and base of vein 11. Hind wing: short and broad; cell broad, upper discocellular shorter than middle, the lower the longest, slightly concave in its upper half; termen more or less obtusely pointed at apex of vein 2. Antennæ about half length of fore wing, club gradually spatulate, blunt at apex; eyes naked; legs slender, claws very small, strongly curved.

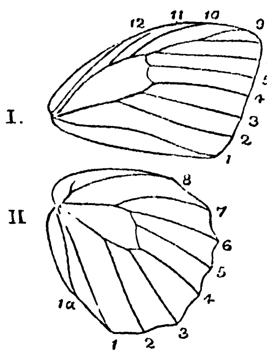

Fig. 50.—*Ixias pyrene*, venation.

"In this genus seasonal variation is shown on the upperside by the black markings being broader and more prominent, and on the underside in the ocelli and other markings tending to become obsolete in the rainy-season forms." (*Watson.*)

Key to the forms of Ixias.

♂ ♂.

a. Upperside both wings: ground-colour clear gamboge-yellow.
  a'. Upperside fore wing: ground-colour not extended into base of interspace 3.
    a². Upperside fore wing: preapical orange patch extended into and across apex of cell.
      a³. The extension of orange colour into apex of cell interrupted, present above and below; a black discocellular spot...... *I. pyrene* (typical), p 193.
      b³. The extension of orange colour into cell not interrupted, passes across cell .... *I. pyrene*, var. *evippe*, p. 194.
    b². Upperside fore wing: preapical orange patch extended only into upper apex of cell.... *I. pyrene*, var. *pirenassa*, p. 194.

b'. Upperside fore wing: ground-colour extended into base of interspace 3 .... *I. pyrene*, var. *cingalensis*, p. 194.

b. Upperside both wings: ground-colour pale yellowish white .... *I. verna*, p. 195.

c. Upperside both wings: ground-colour pure white.

a'. Upperside fore wing: preapical orange patch extended into upper apex of cell .... *I. marianne*, p. 196.

b'. Upperside fore wing: preapical orange patch not extended into cell .... *I. nola*, p. 197.

606. **Ixias pyrene** (Pl. XVIII, figs. 118, 120 ♂, 119 ♀), *Linn.* (Papilio) *Mus. Ulr.* 1764, p. 241; *Elwes, Trans. Ent. Soc.* 1888, p. 420; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 503–508.

Papilio evippe, *Drury, Ill. Ex. Ins.* i, 1773, p. 11, pl. 5, fig. 2 ♂.

Papilio rhexia et sesia, *Fabr. Syst. Ent.* 1775, p. 476; *& Gen. Ins.* 1777, p. 257.

Thestias pirenassa, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 395, pl. 9, fig. 4 ♂.

Ixias latifasciata, *Butler, P. Z. S.* 1871, p. 252, pl. 19, fig. 3 ♂.

Ixias satadra, kausala et moulmeinensis, *Moore, A. M. N. H.* (4) xx, 1877, pp. 49 & 50, *& P. Z. S.* 1878, p. 837.

Ixias frequens, dharmsalæ, et watti, *Butler, P. Z. S.* 1880, pp. 150, 151, pl. 15, figs. 6 & 7, 8 & 9, & 1.

Ixias cingalensis, *Moore, Lep. Ceyl.* i, 1881, p. 126, pl. 50, figs. 2, 2 *a*.

Ixias jhoda et colaba, *Swinhoe, P. Z. S.* 1885, p. 142, pl. 9, figs. 3 & 4, & 6.

Dry-season brood.—♂. *Upperside*: deep sulphur-yellow. Fore wing: base and basal half of costa thickly irrorated with black scales; apical half of the wing black, with an enclosed, large, irregularly triangular, orange-coloured patch, the apex of which is more or less broadly rounded and blunt; the orange colour extends into the apex of the cell but is interrupted there by a black discocellular spot that spreads diffusely inwards and joins the black oblique bar which forms the base of the orange patch; veins that traverse this latter, black. Hind wing: uniform with a little black scaling at extreme base; termen with a dusky-black somewhat narrow border (sometimes entirely absent) which decreases in width posteriorly. *Underside*: a darker yellow, sparsely irrorated with fusco-ferruginous short strigæ and minute spots. Fore wing: base and posterior area broadly, with a whitish pale virescent tint; the strigæ and minute spots most numerous towards the apex and along the termen; interspaces 4, 5, 6 and 8 with a curved subapical series of small, rounded, dull ferruginous spots and a similar spot on the discocellulars. Hind wing also with a ferruginous spot on the discocellulars, followed by a postdiscal series of similar spots in interspaces 3 to 8, all or most of them centred with white; the spots in interspaces 5, 6 and 8 the largest, those in 5 and 6 often coalescent. Antennæ and thorax anteriorly dull ferruginous, thorax posteriorly and abdomen above fuscous black; head, thorax and abdomen beneath yellow.—♀. *Upperside*: white faintly tinged with yellow. Fore wing: apical half black, with an enclosed, irregular, broad, oblique patch of the ground-colour that extends into the upper apex of the cell, on the inner side of this the black is reduced to a short oblique bar broadened at the lower apex of the cell, from whence it is continued as a somewhat slender diffuse oblique streak to the tornus, where it broadens again abruptly and meets the black on the termen; the outer margin of the oblique white patch is irregularly crenulate, sometimes trisinuate; the black colour on the apex often forms a right angle on vein 4; on the white patch posteriorly there is a black spot in interspace 2 and another in interspace 3. Hind wing: uniform, a few subobsolete slender, fuscous, transverse strigæ posteriorly; the terminal margin sometimes with (more often without) a narrow dusky black edging, broadened anteriorly at the apices of the veins. *Underside*: similar to that in the ♂, with similar markings, the ground-colour a dark dull ochraceous, the fusco-ferruginous strigæ more numerous. Antennæ, head, thorax and abdomen as in the ♂.

Wet-season brood.—♂ ♀. *Upperside*: differs in the broader, more pronounced, black terminal edging to the hind wing, which is often remarkably broad, and in the ♀ by the ground-colour which is pale yellow. *Underside*: the fusco-ferruginous strigæ and spots often subobsolete, occasionally entirely absent in the ♂.

Exp. ♂ ♀ 43–62 mm. (1·70–2·45").

Hab. Nearly throughout our limits, but not in the desert parts; extends to China and the Malayan Subregion.

This insect was described originally from a dry-season ♂, probably from China. It is most variable in size, and in seasonal dimorphisms of colour. It is also subject more or less to local variation, according to the humidity or dryness of the climate in particular localities. Moreover, the characters peculiar to the dry- or wet-season form are most unstable. It is not uncommon to find specimens with the wet-season character of a broad, black border to the hind wing on the upperside, and on the underside with the prominent fusco-ferruginous transverse strigæ and spots, associated with the dry-season form. Again in the ♂, the width of the orange patch on the fore wing is very variable. Broadly speaking however, and taking the males only, *I. pyrene* can be divided into two groups.

(1) *Pyrene group.*—Fore wing: with the orange patch on the upperside broad, extended right across the apex of the cell, but in typical *pyrene* interrupted there by a black discocellular spot. To this group belong *evippe*, Drury, *rhexia*, Fabr., *sesia*, Fabr., and *latifasciata*, Butler.

(2) *Pirenassa group.*—Fore wing: with the orange patch on the upperside narrower, extending only into the upper apex of the cell. To this group belong *kausala*, Moore, *satadra*, Moore, *moulmeinensis*, Moore, *frequens*, Butler, *dharmsalæ*, Butler, *watti*, Butler, *cingalensis*, Moore, *jhoda*, Swinhoe, and *alana*, Swinhoe. In the key to the forms I have diagnosed the differences in three of the principal varieties.

607. **Ixias verna,** *Druce, P. Z. S.* 1874, p. 108, pl. 16, figs. 5, 6, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 503–507; *Butler, A. M. N. H.* (7) i, 1898, p. 142.
Ixias latifasciata, *Butler, P. Z. S.* 1871, p. 252, pl. 19, fig. 3, ♂ only.
Ixias pallida et citrina, *Moore, P. Z. S.* 1878, p. 837.

Race andamana.

Ixias andamana, *Moore, P. Z. S.* 1877, p. 590; *Grose-Smith & Kirby, Rhop. Ex.* i, 1888, Ixias, p. 1, pl. 1, figs. 1–3, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 503–507; *Butler, A. M. N. H.* (7) i, 1898, p. 142.
Ixias lena, *Swinhoe, A. M. N. H.* (6) v, 1890, p. 357; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 507–524.

Wet-season brood.— ♂. *Upperside*: white, apical half of fore and terminal margin of hind wing black. The white ground-colour suffused with very pale sulphur-yellow, this colour deepens to a pure sulphur along the margins of the areas occupied by the ground-colour. Fore wing: base shaded with blackish scales; the black apical half with a large oblique orange patch that occupies the middle of interspace 2, basal two-thirds or more of interspaces 3 to 6, 10 and 11, and extends into the apex of cell where it is interrupted by a black spot on the discocellulars; this in some specimens (*I. pallida*, Moore) entirely fills the lower apex of the cell. *Underside*: sulphur-yellow, the fore wing posteriorly below the cell much paler; both wings with sparsely scattered fusco-ferruginous strigæ and minute dots; the spot on the discocellulars the most prominent.— ♀. Somewhat similar to the ♂. *Upperside*: the pale sulphur-yellow ground-colour much restricted; on the fore wing it extends only over the basal two-thirds of interspaces 1 *a* and 1, and the basal fourth of interspace 2; the orange patch much narrower and irregular, forms a short curved band beyond apex of cell that does not quite reach the costal margin; a large elongate spot with a small black spot within the orange, towards its apex, in interspace 3 and an irregular hatchet-shaped spot below this in interspace 2. Hind wing: the black on the terminal margin spreads over fully one-third of the wing. *Underside*: similar to that of the ♂, the fusco-ferruginous strigæ more numerous, the discocellular spots much larger, an obscure discal series of transverse reddish spots on both wings; on the fore wing a very large and prominent patch of reddish brown above the tornus.

Dry-season brood (*I. citrina*, Moore). Differs from the wet-season form as follows:— ♂ ♀. *Upperside* fore wing: the orange patch slightly wider; hind wing: the black terminal margin narrower. *Underside*: both wings with more or less prominent transverse discal series of reddish-brown spots, centred with white, the fusco-ferruginous strigæ and minute spots more abundant. Antennæ deep reddish brown, head and thorax anteriorly with a little reddish-brown pubescence; abdomen above black, beneath: pale yellowish white.

Exp. ♂ ♀ 53–62 mm. (2·1–2·45″).

Hab. Assam; Cachar; Burma; Tenasserim; extending to Siam and into the north of the Malay Peninsula.

Race **andamana,** Moore.— ♂ ♀. Closely resembles the typical form both in wet- and dry-season specimens, but is larger with brighter colours; the orange patch on the fore wing distinctly a rich orange-red and proportionately narrower than in *I. verna.* The dry-season form (*I. lena*, Swinhoe) has the ferruginous discal series of spots, and on the fore wing the reddish-brown tornal patch characteristic of dry-season specimens, very conspicuous and prominent.

Exp. ♂ ♀ 64–74 mm. (2·54–2·94″).

Hab. The Andamans.

608. **Ixias marianne,** *Cramer* (Papilio), *Pap. Exot.* iii, 1782, pl. 217, figs. C–E; *Watson, Jour. Bomb. N. H. Soc.* viii, 1893, pp. 507, 508, pl. 2, figs. 17–19; *Butler, A. M. N. H.* (7) i, 1898, p. 143.
Ixias agniverna, *Moore, A. M. N. H.* (4) xx, 1877, p. 50.
Ixias depalpura, *Butler, P. Z. S.* 1883, p. 153, pl. 24, figs. 6, 7.
Ixias meridionalis et cumballa, *Swinhoe, P. Z. S.* 1885, p. 140, pl. 9, fig. 5, & p. 141, pl. 9, figs. 13 & 14.

Wet-season brood.— ♂. *Upperside*: chalk-white; apical half of fore and terminal margin of hind wing broadly black, the black on the latter broadest anteriorly. Fore wing: a broad rich orange patch obliquely across the black area extended to the upper apex of the cell, narrowed posteriorly and spread above the tornus into interspace 1; opposite the apex of the cell this orange patch is very broad and leaves only the apex of the wing and a comparatively narrow band along the termen and costa black; base of the wing irrorated with black scales. *Underside*: rich sulphur-yellow as in most of the forms of the genus, irrorated with fusco-ferruginous, short, transverse strigæ and minute dots. Fore wing: the orange patch of the upperside plainly seen by transparency on the disc; a broadly triangular area below the cell white; discocellular spot large and prominent, centred with white. Both fore and hind wings with the discal transverse series of reddish-brown spots, in other forms characteristic of the dry-season broods, present and more or less conspicuous, the spots always centred with white; on the fore wing the patch above the tornus prominent and in some specimens very large. Antennæ reddish brown, head and thorax anteriorly with reddish-brown hairs, thorax above with white hairs, abdomen black; beneath: head, thorax and abdomen white.— ♀. *Upperside*: similar. Fore wing: the orange patch on the black apical area narrower, posteriorly truncate, not extended below interspace 2; an outer transverse series of four black spots on the orange patch in interspaces 2 to 5. *Underside*: as in the ♂, the markings slightly larger. Antennæ, head, thorax and abdomen similar.

Dry-season brood.—In both sexes this differs less from the wet-season form than it does in *I. pyrene* and *I. verna*. The characteristic dry-season markings on the underside are more pronounced, sometimes remarkably so.

Exp. ♂ ♀ 54–56 mm. (2·15–2·61″).

Hab. N.W. Himalayas as far east as Kumaon; Punjab; Bengal; Central, Western and Southern India; Ceylon.

609. **Ixias nola,** *Swinhoe, P. Z. S.* 1889, p. 399; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 503–508; *Butler, A. M. N. H.* (7) i, 1898, p. 143.

♂ ♀. Very closely resembles *I. marianne* in both sexes, but the few specimens I have seen are constant in coloration, and differ from *marianne* as follows:—♂. *Upperside*, fore wing: orange patch on black apical half narrow, not extended to the discoidal cell at all, the black that borders it on the inner side subobsolete below vein 4. Hind wing: the black terminal border is much restricted and occupies in some specimens only the anterior third of the terminal margin, in no specimen is there more than a mere indication of it on the posterior portion of the termen. *Underside*: similar to the underside of *I. marianne*.—♀. *Upperside*, fore wing: the orange patch on black apical half still narrower; the black that borders it on the inner side completely interrupted between veins 3 and 4; the outer series of black spots on the orange so conspicuous in *marianne* reduced to one in interspace 3 and another in interspace 4. Hind wing: as in the ♂. *Underside*: similar to that in *I. marianne* ♀. Antennæ, head, thorax and abdomen as in that form.

Exp. ♂ ♀ 50–55 mm. (1·95–2·20″).

Hab. So far as recorded confined to Mahableshwar, one of the high peaks of the Western Ghâts in the Satara district, at from 3500 to 4500 feet.

It is very doubtful if this is not a variety of *I. marianne*. A local observer is wanted who will devote his attention to the breeding of this form, and to that of *I. marianne*, which probably occurs with it.

Genus APPIAS.

Appias, *Hübner, Verz. bek. Schmett.* 1816, p. 91.
Catophaga, *Hübner, tom. cit.* p. 93.
Hiposcritia, *Geyer in Hübner's Zutr. Exot. Schmett.* iv, 1832, p. 16.
Tachyris, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 361.

Type, *A. zelmira*, Cramer, from India.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa widely arched; apex acute, subacute, slightly rounded or slightly falcate, always more rounded in the ♀ than in the ♂; termen straight; tornus well-marked; dorsum straight or slightly sinuous; cell always a little longer than half the length of the wing; vein 6 out of 7 beyond apex

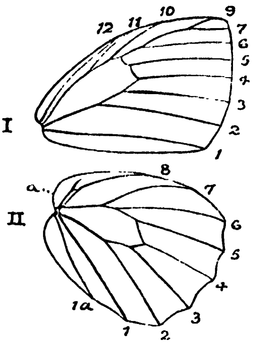

Fig. 51.—*Appias hippo*, venation.

of cell, upper discocellular therefore absent; middle discocellular concave, in typical *Appias* equal to lower discocellular, in other forms shorter; the lower discocellular concave; vein 8 absent, 9 out of 7, the fork closer or even much closer to apex of wing than to apex of cell; veins 10 and 11 free, 10 always from before apex of cell. Hind wing more or less broadly pear-shaped; veins 1 *a*, 1 to 8 present. Antennæ about half length of fore wing or a little longer: club well-marked and flattened, but more or less gradual; palpi slender, third joint long; eyes naked; abdomen in ♂ with anal brushes of more or less stiff hairs below.

Key to the forms of Appias.

A. Upperside: light orange, darker orange, or crimson; veins more or less defined with black.... *A. nero*, p. 202.

B. Upperside: white, sometimes tinged with pale yellow, never orange or crimson; veins in ♀ only, sometimes defined with black.

a. Fore wing: veins 5 and 7 approximated at base; middle discocellular more than half length of lower discocellular.

a^1. Upperside fore wing: outer black margin or area not produced inwardly in interspace 3.

a^2. Both sexes: underside hind wing with a terminal black band; ♂, underside fore wing: a prominent yellow or white subapical spot.

a^3. Underside hind wing: deep yellow, anterior veins defined with black in wet-season form, concolorous with wing in dry-season form............ *A. hippo* (typ.), p. 203.

b^3. ♂, underside hind wing: pale yellow, veins concolorous with wings at all seasons .... *A. hippo*, race *andrea*, p. 205.

c^3. ♂, underside hind wing: deep yellow, anterior veins prominently edged with black scales in wet-season form, narrowly black in dry-season form, never concolorous with wings .... *A. hippo*, race *taprobana*, p. 205.

b^2. Both sexes: underside hind wing with no terminal black band; ♂, underside fore wing: no subapical yellow or white spot.

a^3. ♂, underside: pure white in wet-season form, tinged with ochraceous in dry-season form.

a^4. ♂, underside hind wing: immaculate at all seasons .... *A. libythea*, p. 200.

b^4. ♂, underside hind wing: veins more or less broadly black, white only in extreme dry-season form .... *A. libythea*, race *zelmira*, p. 201.

b^3. ♂, underside hind wing: yellow or ochraceous at all seasons.

a^4. ♂, upperside fore wing: outer black margin narrow, ill-defined, immaculate at all seasons.

a^5. ♀, underside fore wing: oblique curved black band on outer half broad, its outer margin more or less even; ♂, apex of fore wing blunt.

a^6. ♂, upper and under sides fore wing: without a postdiscal black spot in interspace 3; upperside white .... *A. paulina*, p. 210.

b^6. ♂, upper and under sides fore wing: a postdiscal black spot in interspace 3, sometimes faint and ill-defined, but always traceable; upperside cream-colour .... *A. galathea*, p. 211.

b^5. ♀, underside fore wing: oblique curved black band on outer half narrow, its outer margin uneven, zigzag; ♂, apex of fore wing sharply pointed .... *A. albina*, p. 212.

b^1. ♂, upperside fore wing: outer black margin or area produced inwardly in interspace 3*.

a^2. ♂, underside fore wing: oblique, curved, black band on outer half terminated on vein 2, sometimes reduced to a mere black spot in interspace 3 .... *A. leis*, p. 213.

b^2. ♂, underside fore wing: oblique, curved, black band on outer half extended to tornal angle or altogether absent ...... *A. wardi*. p. 214.

b. Fore wing: veins 5 and 7 approximate at base, middle discocellular less than half length of lower discocellular.

a^1. ♂, upperside fore wing: no isolated discocellular black spot.

a^2. ♂, upperside fore wing: no prominent discocellular black band.

a^3. ♂, underside fore wing: the discal black band narrow; hind wing not richly coloured in wet-season form .. *A. indra*, p. 205.

b^3. ♂, underside fore wing: discal black band broad; hind wing richly coloured in wet-season form .... *A. indra*, race *narendra*, p. 207.

b^2. ♂, upperside fore wing: a broad black band from before middle of costa that crosses discocellular nervules and joins outer black margin .... *A. lalage*, race *lagela*, p. 209

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[*] Except in dry-season form of *A. leis*.

b'. ♂, upperside fore wing: generally with an isolated discocellular black spot.—♀. Wet-season form: upperside fore wing with a black discocellular band as in *lagela*...... } *A. lalage* (typ.), p. 208.

610. **Appias libythea**, *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 471; *Moore*, *Lep. Ceyl.* i, 1881, p. 134, pl. 52, figs. 3, 3 *a*, ♂ ♀; *Davidson & Aitken*, *Jour. Bomb. N. H. Soc.* v, 1890, p. 358; *iid. tom. cit.* x, 1897, p. 573; *Moore*, *Lep. Ind.* vi, 1905, p. 203, pl. 542, figs. 2, 2 *a*, 2 *b*, & 3, 3 *a*, 3 *b*, ♂ ♀.

Appias ares, *Swinhoe*, *P. Z. S.* 1885, p. 138.

Appias retexta, *Swinhoe*, *A. M. N. H.* (6) v, 1890, p. 360, ♂ ♀.

Race zelmira.

Papilio zelmira, *Cramer*, *Pap. Exot.* iv, 1782, pl. 320, figs. C, D, ♀.

Appias zelmira, *Hübner*, *Verz. bek. Schmett.* 1816, p. 91; *Watson*, *Jour. Bomb. N. H. Soc.* viii, 1894, p. 497, pl. 2, figs. 1–5; *Moore*, *Lep. Ind.* vi, 1905, p. 200, pl. 542, figs. 1, 1 *a f*, ♂ ♀.

Appias olferna, *Swinhoe*, *A. M. N. H.* (6) v, 1890, p. 358.

Appias irvinii, *Swinhoe*, *tom. cit.* p. 359.

Wet-season brood.—♂. *Upperside*: pure white. Fore wing: costa, apex and termen anteriorly very narrowly shaded with dusky-black scales, the black colour produced very finely along the veins for a short distance; the rest of the veins white. *Underside*: pure white, the black colour merely indicated along the costa and at apex.—♀. *Upperside*: white. Fore wing: costa, the apex and termen very widely and the discoidal cell dusky black, the black in the cell produced in a broad streak to the black on the termen, so as to leave only a short oval oblique bar of the ground-colour beyond the cell; the black on the terminal portion of the wing narrows posteriorly and has its inner margin irregular; on the posterior inner portion of the wing also there is a somewhat diffuse dusky-black streak from base, narrowed outwardly and not extended to the black on the terminal margin. Hind wing: terminal margin more or less broadly black; a shading of dusky-black scales that forms a diffuse subcostal streak from base, and another more diffuse obscure streak across the disc that leaves between it and the dark terminal margin a series of, posteriorly, very ill-defined markings of the white ground-colour which decrease in size up to interspace 6. *Underside*: white with similar markings that are however, more diffuse. Fore wing: the black along the terminal margin interrupted by a series of streaks of the white ground-colour in the interspaces. Hind wing: the black scaling along the terminal margin very faint, the dusky shading on the basal and discal areas of the wing as on the upperside, but more or less obsolescent; a faint tinge of yellow on the humeral angle. Antennæ in both sexes dusky black, obscurely spotted with white; head, thorax and abdomen above bluish white; beneath white.

Dry-season brood.—♂. Similar, but the narrow black markings on the fore wing still more restricted.—♀ also similar but the black markings of the *upperside* on the fore wing restricted to the upper half of the cell, and the markings on costa, the apex of the wing and the termen altogether much narrower than in the wet-season form. On the hind wing the markings are restricted to a narrow macular band along the termen, with mere indications of a dusky detached streak in the middle of the disc. *Underside*: white in both sexes; apex of fore wing and the whole of the hind wing with an ochraceous tint. In the ♀ the black markings of the upperside show through by transparency. Antennæ, head, thorax and abdomen as in the wet-season form.

Exp. ♂ ♀ 54–66 mm. (2·14–2·62").

Hab. The Punjab; Mussoorie; Delhi: plains of Bengal; Orissa; Western and Southern India; Ceylon.

Larva. "Reared a good many in Bombay during April and May on *Capparis horrida*. The larva is long, green, somewhat depressed, and has the rough surface and general aspect of a *Terias* or a *Catopsilia*, but the anal extremity tapers a little, and is slightly, but distinctly, bifid."

Pupa. "The pupa is of quite a different type from *Terias* or *Catopsilia*. It is closely attached to a leaf and the wing-cases do not form a keel, but there is an acute dorsal prominence just behind the head, and a transverse dorsal ridge in the middle connecting two angular lateral processes. The head ends in a short snout. The colour is variable and probably depends on situation." (*Davidson & Aitken.*)

Race **zelmira**, Cramer.— ♂ ♀. Differs from the typical form as follows:—*Wet-season brood.*— ♂. *Upperside*, fore wing: base with an obscure bluish tint, costa more broadly black; apex and termen with a series of short, black streaks along the veins that are dilated at their inner apices, and thus form a more or less incomplete, transverse, postdiscal, excurved band that is not extended below vein 3. Hind wing with a terminal series of triangular spots at the apices of the veins. *Underside*: pure white. Fore wing: markings as on the upperside. Hind wing: all the veins except the basal portion of the median and of veins 5 and 6 conspicuously bordered with black; this gives the appearance of a series of three transverse black lines that cross the wing, from the posterior one of which other black lines radiate to the termen; humeral angle tinged with yellow.— ♀. *Upperside*: much as in *libythea*, but the black markings broader, more clearly defined. Fore wing: an anterior, subterminal, transverse series of three or four elongate spots of the white ground-colour is conspicuously apparent on the black margin of the wing. Hind wing: the white ground-colour much restricted and appears merely as a comparatively large upper discal patch and four or five postdiscal spots. *Underside*: white; the black markings of the upperside show well through by transparency, the areas covered by them are more or less densely irrorated on the hind wing with yellow scales, which are also less densely scattered over the apex of the fore wing.

Dry-season brood.— ♂. *Upperside*: differs from the wet-season form chiefly in the black streaks at apex and along the anterior portion of the termen on the fore wing, which do not extend so far inwards, although the streaks themselves are broader. Hind wing: the series of connected triangular black spots along the termen reduced to an incomplete series of terminal spots or altogether absent. *Underside*: white with an obscure yellowish tinge on the apex of the fore and the whole of the hind wing. Fore wing with an irroration of black scales along the basal half of the costa that spreads into the cell. Hind wing with a short diffuse cross-bar of like scales on the disc.—♀. *Upperside*: as in the wet-season form, but the black markings are more restricted and allow more of the white ground-colour to appear. *Underside*: similar to the underside in the dry-season form of the ♂, but the irroration of black scales on the fore wing fills the cell, extends in a narrow streak in interspace 4, and meets an oblique postdiscal lunular band of like scales; on the hind wing the discal cross-bar of black scaling broader. Antennæ, head, thorax and abdomen in both sexes and in both seasonal forms as in *libythea*.

Exp. ♂ ♀ 54–68 mm. (2·14–2·69″).

Hab. Sikhim, at low elevations; the plains of Bengal; Assam; Burma; Tenasserim; extending to Siam.

Both races seem to meet in the plains of Bengal, but broadly speaking *libythea* is the western and southern form, *zelmira* the eastern form.

611. **Appias nero** (Pl. XVI, fig. 108), *Fabr.* (Papilio) *Ent. Syst.* iii, 1793, p. 153; *Moore* (Pieris). *Cat. Lep. Mus. E. I. C.* i. 1857, p. 70; *Wallace* (Tachyris), *Trans. Ent. Soc.* (3) iv, 1867, p. 378; *Elwes* (Tachyris), *Trans. Ent. Soc.* 1888, p. 418; *Butler*, *P. Z. S.* 1872, p. 46; *Distant, Rhop. Malay.* 1885, p. 311, pl. 24, figs. 9, 10, ♂ ♀.

Pieris thyria, *Godart, Enc. Méth.* ix, 1819, p. 147.

Pieris figulina, *Butler, A. M. N. H.* (3) xx, 1867, p. 399, pl. 8, fig. 1 ♀.

Tachyris galba, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 378; *Watson* (Catophaga), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 499.

Appias nebo, *Grose-Smith & Kirby, Rhop. Exot.* ii, 1894, Appias, pl. 1, figs. 1, 2, ♂.

♂. *Upperside*: from vermilion to deep crimson-red, the veins more or less black; in certain specimens the veins towards their apices, especially on the fore wing, are diffusely shaded with black; terminal margins of both fore and hind wings and fore wing at apex irrorated and shaded with black scales. *Underside*: fore wing on apical area and nearly the whole of the hind wing rich chrome-yellow, base and disc of fore wing orange; costa and dorsal margin of fore, and dorsal margin broadly of hind wing yellow; veins concolorous. Antennæ black, speckled sparsely with white, orange at apex; head, thorax and abdomen black with dark greyish-green hairs.—♀. *Upperside*: ground-colour similar, the markings differ as follows:—Fore wing: costa narrowly, apex and termen more broadly black; a short, very oblique black band from the middle of the costa outwards, ending subterminally in interspace 4, enclosed between it and the black on the terminal margin is a transverse spot of the ground-colour; a transverse subterminal black bar also in interspace 2, similarly encloses between it and the black on the terminal margin a spot of the ground-colour. Hind wing: terminal margin neatly bordered with black, which extends for a short distance inwards along each vein. *Underside*, fore wing: base and disc vermilion-red, apex dusky ochraceous, with a pale ill-defined short bar that limits it on the inner side; an oblique black band from costa and a short transverse similar band in interspace 2 as on the upperside, but indicated more by transparency than by actual scaling. Hind wing: dull ochraceous, darkening to ochraceous red along the terminal margin; an irregular transverse diffuse purplish band across the disc. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 70–80 mm. (2·76–3·18″).

Hab. Sikhim; Assam; Manipur; Upper Burma: the Shan States; Tenasserim; extending to Siam; the Malay Peninsula; Nias Island; Sumatra; Java; Borneo to the Philippines.

612. **Appias hippo**, *Cramer* (Papilio), *Pap. Exot.* iii, 1782, pl. 195, figs. A, B; *Moore* (Pieris), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 71; *Watson, Jour. Bomb. N. H. Soc.* x, 1897, p. 670.

Appias vacans, *Butler, Trans. Ent. Soc.* 1870, p. 490; *id. Lep. Exot.* 1872, p. 90, pl. 34, figs. 5, 6.

Appias hippoides, *Moore, Trans. Ent. Soc.* 1881, p. 312; *id. Lep. Ind.* vi, 1905, p. 194, pl. 540, figs. 1, 1 *a*–1 *g*, ♂ ♀, & pl. 541, figs. 1, 1 *a*–1 *c*, ♂ ♀.

Appias hippoides, *var.* epicœna, *Swinhoe, P. Z. S.* 1889, p. 398.

Race andrea.

Colias andrea, *Ersch. in Kotzeb. Reise*, iii, 1821, p. 215, pl. 10, figs. 23 *a*, 23 *b*; *Wallace* (Tachyris), *Trans. Ent. Soc.* (3) iv, 1867, p. 366.

Appias nicobarica, *Moore, Lep. Ind.* vi, 1905, p. 198.

Race taprobana.

Appias taprobana, *Moore, P. Z. S.* 1879, p. 143; *id. Lep. Ceyl.* i, 1881, p. 135, pl. 52, figs. 1, 1 *a*–1 *c*, ♂ ♀, larva & pupa; *id. Lep. Ind.* vi, 1905, p. 198. pl. 541, figs. 2, 2 *a*–2 *c*, ♂ ♀.

Appias vacans, *Moore* (*nec Butler*), *Lep. Ceyl.* i, 1881, p. 135, pl. 52, figs. 2, 2 *a*, ♂.

Appias latifasciata, *Moore, Trans. Ent. Soc.* 1881, p. 312, ♂ ♀; *id. Lep. Ind.* vi, 1905, p. 199, pl. 541, figs. 3, 3 *a*, 3 *b*.

Appias aperta, *Butler, A. M. N. H.* (5) xviii, 1886, p. 188; *Moore, Lep. Ceyl.* iii, 1887, p. 532.

Appias (Catophaga) hippoides, *Davidson, Bell & Aitken* (*nec Moore*), *Jour. Bomb. N. H. Soc.* x, 1897, p. 574.

Wet-season brood.—♂. *Upperside*: white; along the costal margin of the fore wing and the terminal margin of the hind wing somewhat broadly bluish, due to the black colour of the underside that shows plainly through; costal margin of fore wing irrorated densely on basal half, more sparingly on apical half, with black scales; terminal margins of both fore and hind wings edged with black, this colour produced triangularly inwards along the veins for a short distance; veins of both wings white, subcostal vein and veins above vein 6 on fore wing black. *Underside*, fore wing: white; extreme base of costa irrorated with black scales, sometimes condensed into a broad edging along the costal margin, which is widened at the apex and continued along the terminal margin in a gradually narrowing border to the tornus, the terminal edging inwardly produced along the veins as on the upperside; a yellow or white oval spot superposed on the black area at the apex in interspace 6. Hind wing: sulphur-yellow; veins concolorous; terminal margin with a black edging as on the upperside but much broader, though not so prominently produced inwards along the veins. Antennæ black, sparingly spotted with minute white dots; head, thorax and abdomen white with a bluish tinge.—♀. *Upperside*: dusky blackish brown, variegated more or less with white on the fore wing, in short somewhat broad streaks in interspaces 1, 2, 4 and 5; these streaks very variable in width and length. Hind wing on the basal half and along the dorsum broadly white; the extent of the white is very variable and very ill-defined, shading imperceptibly into the dusky brown. *Underside*: fore wing similar, the white streaks much broader and longer; an additional dusky-white longitudinal streak along middle of the cell; base of wing dusted with yellow scales; apex with a large diffuse purplish patch. Hind wing: basal two-thirds pale sulphur-yellow; apical third dusky brownish black, the margins of the two colours fairly sharply defined, veins crossing the disc black. Antennæ as in the ♂; head, thorax and abdomen above with greenish pubescence; beneath white.

Dry-season brood.—♂ ♀. Similar to the wet-season form but smaller. In the ♂ the black edging to the wings both on the upper and under sides is narrower, often very markedly so. In the ♀ the differences are more conspicuous in the extreme forms. Specimens captured in the height of the hot weather or in specially dry localities resemble the ♂ of the wet-season form, except that the irroration of black scales along the costal margin in the latter is replaced by a broad continuous streak, widened at apex and continued in a similar manner as in the ♂, along the terminal margin to the tornus, the inward prolongations of the black colour along the veins more marked. On the underside the dry-season ♀ very closely resembles the wet-season ♂, the only marked difference is the absence of the elongate oval spot in interspace 6 in the fore wing. This form is the *Appias hippoides*, var. *epicœna*, Swinhoe. Between it and the dark wet-season form of the ♀ many intermediate individual specimens can be found in almost every large collection.

Exp. ♂ ♀ 54–82 mm. (2·14–3·24″).

Hab. Sikhim; Lower Bengal; Orissa; Assam; Burma; Tenasserim; extending into Siam and China to the east, and southwards to the Malay Peninsula and Sumatra.

Race **andrea**, Erscholtz.—A slightly differentiated form scarcely established, even as a local race, as yet. It is sufficiently characterized in the key to the forms (*supra*).

Exp. ♂ ♀ 68–76 mm. (2·66–3″).

Hab. Recorded within our limits from the Nicobars. Found in the Philippines.

Race **taprobana**, Moore.—*Wet-season brood* (*latifasciata*, Moore). ♂. Closely resembles the wet-season form of typical *hippo*, but the colours are brighter; the black terminal bordering to the wings on both upper and under sides broader, especially on the underside of the hind wing, the yellow also on this wing is of a deeper, more vivid tint. It can, moreover, be discriminated from *hippo* ♂ at once by the subcostal vein and veins 6, 7 and 8 where they cross the yellow ground-colour, which are not concolorous but conspicuously edged with black scales, these latter often form a broad streak along the basal half of vein 7.—♀. Does not differ materially from the wet-season form of the ♀ of *hippo*. In the few specimens of the females of this race that I have had an opportunity of examining, the dusky purplish-brown on the terminal half of the hind wing on the underside has always been broader than in the females of typical *hippo*.

Dry-season brood.—♂. Can be separated from the typical form as follows:—*Upperside* fore wing: vein 6 more or less broadly edged or defined with black. *Underside* hind wing: terminal black border much broader; subcostal vein and veins 7 and 8 black, not concolorous with the yellow ground-colour.—♀. Differs only from the ♀ of *hippo* by the greater width of the purplish black terminal margin of the hind wing on the underside. Antennæ, head, thorax and abdomen in both sexes as in typical *hippo*.

Exp. ♂ ♀ 64–76 mm. (2·5–3″).

Hab. Southern India: Malabar; Travancore; Ceylon.

Larva and *pupa*. "We have bred from May to December on capers. The eggs are laid in clusters. The larva and pupa are not very different from those of the last species (*A. libythea*, supra); the pupa may be distinguished from the last by the second segment being produced laterally into a tongue-like process which embraces the shoulder." (*Davidson, Bell & Aitken.*)

613. **Appias indra,** *Moore* (Pieris), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 74; *Wood-Mason & de Nicéville* (Hyposcritia), *J. A. S. B.* 1886, p. 372; *Elwes* (Tachyris), *Trans. Ent. Soc.* 1888, p. 419; *Moore* (Hyposcritia), *Lep. Ind.* vi, 1905, p. 226, pl. 549, figs. 1, 1*a*–1*h*, ♂ ♀.
Hyposcritia shiva, *Swinhoe, P. Z. S.* 1885, p. 138, pl. 9, figs. 1, 2; *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 49.

Race narendra.

Appias narendra, *Moore, A. M. N. H.* (4) xx, 1877, p. 48, ♂; *id. Lep. Ceyl.* i, 1881, p. 134, pl. 51, figs. 4, 4 *a*, 4 *b*, ♂ ♀; *id.* (Hyposcritia) *Lep. Ind.* vi, 1905, p. 228, pl. 550, figs. 1, 1 *a*–1 *i*, ♂ ♀.

Wet-season brood.—♂. *Upperside*: white. Fore wing: base and basal half of costa thickly irrorated with black scales; a minute black spot on the discocellulars; the apical half of the costa, the apex and the termen above vein 2 broadly black; the inner margin of the black colour broadly produced inwards in interspace 3; three obliquely-placed spots of the ground-colour on the apical area. Hind wing: uniform white with a minute black speck on the discocellulars. *Underside*, fore wing: white; costa at base pea-green; beyond with a broad black stripe that curves round and crosses the wing postdiscally to the terminal margin above vein 2; this black band produced prominently inwards in interspace 3; apex of wing beyond the black band yellowish, obscurely dusted with black scales. Hind wing pale yellow, with very obscure postdiscal patches of white; the whole wing irrorated somewhat sparsely with minute black scales; discocellular black spot more or less conspicuous.—♀. *Upperside*: white. Fore wing: basal area up to nearly the apex of the cell densely irrorated with blackish scales; remainder of the wing black except lower apex of cell, basal two-thirds of interspace 2, and basal third of interspace 3, which are white; apex of wing with two, not three as in ♂, obliquely-placed white spots. Hind wing: dusky black, fading inwardly on basal half of wing to diffuse dusky grey; two or more upper subterminal white spots. *Underside*: similar to that of the ♂. Fore wing: the yellowish-green colour at base more extended: the curved black band that crosses the wing very much broader and produced inwards along the dorsum for a short distance: apical area greenish yellow, with an obscure series of pearly-white patches between it and the black band, a similar short streak on the tornus. Hind wing differs from that of the ♂ in the deeper yellow of the ground-colour, which however, is similarly irrorated with black scales and bars; a conspicuous subterminal series of pearly-white patches.—An intermediate form of the ♀ is common, in which the black area on both fore and hind wings is much restricted; on the hind wing it is reduced to a simple terminal edging that spreads diffusely inwards and obscurely encloses a

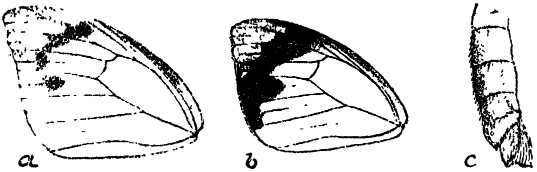

Fig. 52.

a. Underside fore wing: *Appias indra.*
b. Underside fore wing: *Appias indra*, race *narendra.*
c. Abdomen showing anal brush of hairs.

subterminal series of white diamond-shaped spots. Antennæ in both sexes black checkered with white spots; head and thorax with bluish-grey hairs; abdomen black with sparse white scaling; beneath: head, thorax and abdomen white.

Dry-season brood.— ♂. *Upperside*: similar to specimens of the wet-season form, but the black colour on costa, apex and termen very much reduced in extent. *Underside*: the black curved band on fore wing very short, often diffuse and obscure; apex of fore and entire hind wing light earthy brown, more or less densely irrorated with black scales, that on the hind wing run together in places and form ill-defined zigzag markings.— ♀. *Upperside*: similar to that of the ♂, the black on fore wing of somewhat greater extent; termen of hind wing obscurely irrorated with black scales. *Underside*: similar to that of the ♂; the oblique black band on fore wing broader. Antennæ in both sexes dark brown; head with ochraceous-brown, thorax with bluish-grey hairs, abdomen blackish; beneath: head, thorax and abdomen white.

Exp. ♂ ♀ 54-74 mm. (2·1-2·92″).

Hab. The Himalayas; Nepal; Sikhim; Bhutan; Lower Bengal; Assam; Burma; Tenasserim; extending to the Malay Peninsula, Cochin China and China.

Race **narendra**, Moore.—A slightly differentiated and more or less local form, notwithstanding that a few specimens which I have seen from Assam, which should properly belong to *A. indra*, more closely resemble typical *narendra* from South India and Ceylon.

Wet-season brood.— ♂. *Upperside*: differs chiefly from that of ♂ *indra* in the hind wing, which is bordered narrowly with black along the termen. *Underside*: as in *indra*, but the yellow colour more vivid and the black bisinuate band that crosses the fore wing notably broader.— ♀. Differs from ♀ *indra* on the upperside in the restriction of the black colour, which has also its inner margin more clearly defined. No ♀ *narendra* that I have seen is ever so dark above as the extreme rain-season form of ♀ *indra*. *Underside*: similar to the underside in *indra* ♀, but more closely sprinkled with black scales on the hind wing.

Dry-season brood.—The difference between the seasonal forms is less marked than in *A. indra.*— ♂. *Upperside*: differs in the hind wing which is always margined along the termen, though often very narrowly, with black; this colour also extends shortly in a few lines along the veins. *Underside*: as in *A. indra*, but the shade of brown on apex of fore wing and over the whole of the hind wing is darker, the irroration of black scales more dense, the black bisinuate band that crosses the wing broader.— ♀. *Upperside*: differs from the wet-season form only in the width of the black on the terminal margin of the hind wing, which band is about half as wide as in rainy-season specimens. *Underside*: similar to the underside in ♀ of the wet-season form.

Exp. ♂ ♀ 58-70 mm. (2·30-2·76″).

Hab. Southern India; Ceylon; Assam.

614. **Appias lalage**, *Doubleday* (Pieris), *Gray's Zool. Misc.* 1842, p. 76, ♀; *Elwes* (Tachyris), *Trans. Ent. Soc.* 1888, p. 419; *Mackinnon & de N.*, *Jour. Bomb. N. H. Soc.* xi, 1898, p. 591; *Moore* (Hyposcritia), *Lep. Ind.* vi, 1905, p. 222, pl. 547, figs. 1, 1 *a*-1 *f*, ♂ ♀, & pl. 548, figs. 1, 1 *a*-1 *e*, ♂ ♀.
Pieris durvasa, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 73.
Catophaga pseudolalage, *Moore, P. Z. S.* 1879, p. 142.
Hyposcritia argyridina, *Butler, A. M. N. H.* (5) xvi, 1885, p. 340, ♂.

Race lagela.

Catophaga lagela, *Moore, P. Z. S.* 1878, p. 838, pl. 52, fig. 4 ♀; *Distant* (Appias), *Rhop. Malay.* 1886, p. 467, pl. 41, fig. 11 ♀; *Moore* (Hyposcritia), *Lep. Ind.* vi, 1905, p. 225, pl. 548, figs. 2, 2 *a*-2 *c*, ♂ ♀.

Wet-season brood.— ♂. *Upperside*: white. Fore wing: base and basal half of costa thickly irrorated with black scales, the latter tinged with yellow; a large black spot in lower apex of cell; apical third of wing black, the inner margin of this black area curved, with a broad projection of black inwards in interspace 3 beyond which outwardly is a large white spot; this black area ends on the terminal margin at vein 2; three obliquely-placed preapical spots white, the upper and lower very obscure. Hind wing: an irregular, somewhat macular bordering of black along the terminal margin which becomes diffuse inwardly and on the tornus; cilia yellow. *Underside*, fore wing: white, the black spot in cell as on the upperside, base of costa yellowish green; thence a narrow stripe along the costal margin that crosses the wing obliquely in a curve to vein 2 and is widened beyond the apex of the cell; in interspace 3 this black band is interrupted by a large white spot, on the inner side of which is a projecting spot of black; apex yellow touched with lilacine in the middle. Hind wing: uniform ochraceous yellow, the veins brighter yellow.— ♀. *Upperside*, fore wing: dull opaque black; an elongate oval, very broad streak from base that terminates midway in interspace 2 and is limited below by vein 1 but crosses the median vein into the cell above; a short curved streak or band occupies the bases of interspaces 4, 5, 10 and 11; a series of three postdiscal spots in

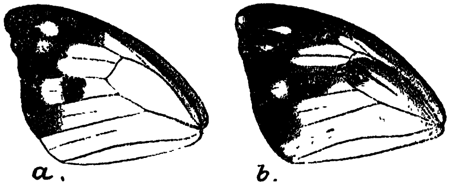

Fig. 53.
a. Upperside fore wing: *Appias lalage.*
b. Upperside fore wing: *Appias lalage*, race *lagela.*

interspaces 1, 3 and 6, the uppermost spot yellow, with one obscure spot on the inner and another on the outer side of it, the three placed obliquely across apical area. Hind wing: basal two-thirds white tinged with yellow chiefly around the base; outer third dusky black that broadens considerably posteriorly to the dorsal margin and anteriorly encloses in interspace 6, sometimes also in 7, an irregular white spot. *Underside*, fore wing: extreme base and lower basal half of cell yellowish green, rest of cell black; above the cell a narrow, yellowish, curved band along the subcostal vein that terminates just beyond the discocellulars in two white elongate spots; a black band along the costa that widens as it crosses the wing postdiscally and spreads downwards to the tornus and for a short distance inwards along the dorsum; enclosed within the black band is a white spot on the tornal angle and another triangular one in interspace 3; apex pearly white tinted with rich purple. Hind wing: uniform, pearly, purplish white. Antennæ in both sexes black spotted sparsely with white; head and thorax with tufted greenish-yellow hairs, abdomen fuscous; beneath: head, thorax and abdomen yellowish white.

Dry-season brood.—♂. *Upperside*: similar to the wet-season form but the black markings smaller and more restricted. *Underside*: with similarly restricted black markings; the apex of the fore and the whole area of the hind wing with the ochraceous yellow of a duller tint than in the wet-season form. Antennæ, head, thorax and abdomen more or less similar to those of the wet-season form.—♀. *Upperside*: very similar to that of the ♂ of the wet-season form. *Underside*: the black markings resemble those on the underside of the ♂ of the wet-season form; the upper half of cell of fore wing however, is yellowish green, the apex lilacine-brown irrorated with black scales. Hind wing: uniform lilacine-brown densely irrorated with black scales which have a tendency to form a broad transverse patch across the middle area of the wing. Antennæ, head, thorax and abdomen in both sexes much as in the wet-season form.

Exp. ♂ ♀ 68–82 mm. (2·70–3·24").

Hab. The Himalayas: Mussoorie to Sikhim and Bhutan, from 4000 to 10,000 feet; the hill-ranges of Assam, Burma, and the Shan States; rare in Lower Burma. It extends eastwards to China.

Race **lagela**, Moore.—♂. *Upperside*: resembles somewhat the upperside of the wet-season form of *A. lalage* ♂, but differs as follows:—Fore wing: upper portion of cell from base to apex black, the black ill-defined and posteriorly diffuse but extended to the large discocellular black spot and thence in a broad stripe to the black on the terminal margin; thus it encloses besides the subterminal white spots a curved, white, obliquely-placed streak beyond the cell. Hind wing: the black border on the terminal margin continuous, not macular but inwardly diffuse. *Underside*: only differs in the cell of the fore wing which is anteriorly shaded with dusky black.—♀. Similar to the wet-season ♀ of *lalage* but on the upperside the black area on apex and termen of fore wing is not continued inwards along the dorsal margin, and the connecting bar between the black in the cell and on the termen is narrowed by a triangular emargination of its lower border at base of interspace 3; on the underside the black area on the termen does not extend to the tornus, and the black area in the cell is separated from that on the termen by the basal third of interspace 3, which is entirely white. Hind wing: both upper and under sides are precisely similar to those of *lalage*. Antennæ, head, thorax and abdomen as in *A. lalage*.

Exp. ♂ ♀ 65–74 mm. (2·56–2·9″).

Hab. Arrakan; Lower Burma; Tenasserim; extending to the Malay Peninsula.

The five next-described forms have been, and I fear still remain, a standing puzzle to Indian Lepidopterists. Treating of a strictly limited fauna, I personally think it very likely that all five are mere varieties of one highly unstable form, not limited either to locality or to season. In this work I have kept them apart simply for convenience of description, for so far as I have studied the material at my disposal, the differences in the five forms are not only not of sufficient importance to constitute specific distinction, but when long series are compared they break down, sometimes in the male, sometimes in the female.

With regard to this close similarity accompanied by variation I have in the remarks succeeding the diagnosis of the family stated what, in my opinion, is the chief causal factor and agent.

615. **Appias paulina,** *Cramer* (Papilio), *Pap. Exot.* ii, 1779, pl. 110, figs. E, F, ♀; *Hübner* (Catophaga), *Verz. bek. Schmett.* 1816, p. 93; *Butler* (Catophaga), *A. M. N. H.* (7) ii, 1898 (excl. syn. in pt.); *Moore* (Catophaga), *Lep. Ind.* vii, 1905, p. 7, pl. 554, figs. 1, 1 *a*–1 *g*, ♂ ♀.

Catophaga lankapura, *Moore, P. Z. S.* 1879, p. 142, ♂ ♀; *id. Lep. Ceyl.* i, 1881, p. 133, pl. 50, figs. 4, 4 *a*, ♂, & pl. 51, figs. 1, 1 *a*, ♀ (wet-season).

Catophaga galene, *Moore* (*nec Felder*), *Lep. Ceyl.* i, 1881, p. 132, pl. 51, figs. 2, 2 *a*, ♂ ♀.

Wet-season brood.—♂. *Upperside*: pure chalk-white. Fore wing: costa, apex and terminal margin more or less densely irrorated with black scales, this irroration narrowed on the termen posteriorly and not extended to the tornus. Hind wing: a much lighter dusting of black scales along dorsum, on tornus and along posterior portion of termen. *Underside*: fore wing white, apex broadly pale yellow. Hind wing: entirely pale yellow.—♀. *Upperside*: fore wing white, irrorated at base and up to as far as two-thirds of the cell with blackish scales, which give that part a bluish-grey appearance; costa broadly and apical half of the wing jet-black; the inner margin of this black area is irregularly curved, extended inwards and forms a right angle on vein 3; thence it turns outwards and is again extended inwards in a rounded curve in interspace 1, finally it is sloped obliquely outwards and terminates on the dorsal margin just before apex of tornal angle; three, rarely four, yellowish spots placed in an outward curve preapically in the black area. Hind wing: pale yellow, the terminal margin broadly black, this colour extended triangularly up the veins for a short distance; base and interspaces 1 and 2 irrorated with black scales. *Underside*, fore wing: as on the upperside but the irroration of black scales at base and in cell replaced by pale yellow; apex of wing from beyond middle of costa in a curve to apex of vein 3, thickly overlaid with rich chrome-yellow. Hind wing: rich chrome-yellow, base greenish; a postdiscal, broad, dark, slightly curved band crosses from vein 2 to the costa near apex of wing. Antennæ black speckled with minute white dots; head in front and thorax with dusky greyish-green hairs; abdomen blackish; beneath: thorax yellow, abdomen white.

Dry-season brood.—♂. *Upper* and *under sides*: similar to those of wet-season specimens, but the irroration of black scales much sparser on the upperside; on the underside the apex of the fore wing and whole surface of the hind wing dull ochraceous, not pale clear yellow.—♀. *Upperside*: similar to that of the wet-season form, but the black area on the fore wing somewhat circumscribed. Hind wing: white, the black terminal border narrower and decreasing in width posteriorly. *Underside*: apex of fore wing and the whole surface of hind wing a beautiful nacreous bluish white. Antennæ, head, thorax and abdomen as in the wet-season form.

Exp. ♂ ♀ 52–76 mm. (2·06–3″).

Hab. Within our limits, Ceylon only; but I have seen specimens from the Malay Peninsula, Siam and Java.

616. **Appias galathea,** *Felder* (Pieris), *Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 485; *Moore* (Catophaga), *Lep. Ind.* vii, 1905, p. 6, pl. 553, figs. 1, 1 *a*–1 *g*, ♂ ♀.
Catophaga paulina, *var.* galathea, *Wood-Mason & de N.*, *J. A. S. B.* 1881, p. 237.
Catophaga roepstorfi, *Moore*, *J. A. S. B.* 1884, p. 44, ♂.

♂. *Upperside*: creamy-white. Fore wing: a very slight irroration of black scales at base, along the costal margin, at apex of wing and for a very short distance down the termen; a round black postdiscal spot in interspace 3, conspicuous in some specimens (wet-season form?), scarcely perceptible in others (dry-season form?); cilia anteriorly dusky black, posteriorly white. Hind wing: uniform; cilia yellowish posteriorly. *Underside*: fore wing white, basal half of cell sulphur-yellow; costa narrowly and apex of wing ochraceous or butter-yellow; the round black postdiscal spot in interspace 3 more clearly defined. Hind wing: uniform butter-yellow. Antennæ brown speckled with white; hairs on head and thorax anteriorly dusky greenish-yellow, on thorax posteriorly bluish, scaling of abdomen white; beneath: head and thorax very pale yellow, abdomen white.—♀. In both seasonal forms almost identical with *A. paulina*, but on the upperside the fore wing has always four or five (not two or three as in *paulina*) preapical white spots, while on the underside the oblique curved black band that crosses the fore wing is slightly narrower and its outer margin more irregular. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 60–68 mm. (2·36–2·7″).

Hab. The Andamans and Nicobars.

617. **Appias albina,** *Boisduval* (Pieris), *Sp. Gén. Lép.* i, 1836, p. 480; *Elwes & de N., J. A. S. B.* 1897, p. 710; *Butler* (Catophaga), *A. M. N. H.* (7) ii, 1898, p. 397.

Pieris rouxii, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 481, ♂.

Pieris neumbo, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 539; *Moore* (Catophaga), *Lep. Ceyl.* i, 1881, p. 131, pl. 50, figs. 3, 3 *a*, 3 *b*, ♂ ♀.

Pieris galene, *Felder, Novara Reise, Lep.* ii, 1865, p. 165; *Moore* (Catophaga), *Lep. Ind.* vii, 1905, p. 9, pl. 555, figs. 1, 1 *a*–1 *i*, ♂ ♀.

Pieris darada, *Felder, Novara Reise, Lep.* ii, 1865, p. 166; *Moore* (Catophaga), *Lep. Ind.* vii, 1905, p. 12, pl. 557, figs. 1, 1 *a*–1 *i*, ♂ ♀.

Catophaga swinhoei, *Moore, Lep. Ind.* vii, 1905, p. 11, pl. 556, figs. 1, 1 *a*–1 *j*, larva & pupa, ♂ ♀.

Closely resembles *A. paulina*, but in both seasonal forms the males can be differentiated by the more acutely pointed fore wing, and the females by the much narrower, oblique, curved black band on the underside of the fore wing. Further and more minute, but apparently constant differences are as follows:—

Wet-season brood.—♂. *Upperside*, fore wing: the irroration of black scales at apex and along termen anteriorly much more sparse and narrow generally than in *paulina*. Hind wing: the irroration of similar scales along dorsal margin and on tornus absent. *Underside*: apex of fore and the whole surface of the hind wing pale dull ochraceous, sometimes with a faint pinkish tint, but never pale yellow as in *paulina*.—♀ dimorphic; differs as follows:—1st Form. *Upperside*: the posterior tornal portion of the black area on fore wing not inwardly rounded, but straight and generally diffuse. *Underside*: very like the underside of the *dry-season form* of *A. paulina* ♀, from which, however, it differs by the narrowness of the oblique curved black band, the outer margin of which is irregularly zigzag, never evenly curved as in *paulina*. 2nd Form. Markings as in the 1st form but the ground-colour on the upperside entirely pale yellow. *Underside*: apical half of cell and disc of fore wing up to the black band pale sulphur-yellow; the oblique curved black band as in the 1st form; interspace 1 *a* whitish; the rest of the fore wing and the entire surface of the hind wing rich chrome-yellow.—♂ ♀. Antennæ, head, thorax and abdomen much as in *A. paulina*, but the antennæ a dusky black and more closely speckled with white; the thorax beneath in ♂ white, never yellow.

Dry-season brood.—♂ ♀. *Upper* and *under sides*: similar to the same in the wet-season specimens, but in the ♂ the dusting of black scales on the upperside has almost, in some specimens completely, disappeared, while on the underside the ochraceous colouring is much paler.—♀. Both dimorphs differ but little from the dimorphs of the wet-season form, only on the upperside the black on the apical half of the fore and on the terminal margin of the hind wing is more restricted, while on the underside the oblique curved black band that crosses the fore wing is distinctly narrower with a tendency to become diffuse.

Exp. ♂ ♀ 60–74 mm. (2·38–2·94″).

Hab. Sikhim up to 4000 feet; Bengal; Western and Southern India: Guzerat; Poona; Kanara; Travancore; Ceylon; the hills of Assam, Burma and Tenasserim. Found also in Malacca, Sumatra, Borneo, Java and the Philippines.

Larva. "Light green with a yellow-white spiracular band from segments 2 & 3 to segment 12, where the band expands somewhat. Head round, shining, yellow . . . . covered with small conical setiferous black tubercles; body rugose, with six transverse rows from above the spiracular region over the dorsum, of small, shining, setiferous, conical black tubercles to each segment; segments 2, 12 and 13 have only a few transverse rows of such tubercles."

Pupa. "Dirty whitish, with a pink shade on segments 4 to 14. The head-process from between the eyes is long, flattened at the sides, slightly curved, pointed at the extremity . . . . edges on ventral surface minutely serrated. The front margin of segment 2 is produced into a small subdorsal tooth, and the dorsal line is rather strongly carinated; thorax highly carinated on the dorsal line . . . .; lateral teeth of segments 6, 7 and 8 are all of the same size and are pointed . . . .; the head-production, the points on segment 2, the teeth on segments 6 and 7 (sometimes) and the extremity of the cremaster black." (*After de Nicéville.*)

618. **Appias leis,** *Hübner* (Catophaga), *Zutr. Exot. Schmett.* 1832, figs. 771, 772, ♀; *Distant, Rhop. Malay.* 1885, p. 313, pl. 25, figs. 6, 7, 10, ♂ ♀.
Catophaga adamsoni, *Moore, Lep. Ind.* vii, 1905, p. 4, pl. 551, figs. 2, 2*a*–2*e*.

Wet-season brood.—♂. *Upperside*: white. Fore wing: base and costa broadly and somewhat thickly irrorated with black scales; apex broadly black; termen with a series of inwardly pointed black triangular spots at the apices of the veins, these spots confluent along the extreme margin; between veins 3 and 6 a short postdiscal black line that ends posteriorly in a large black spot in interspace 3, this line confluent along the veins with the black on termen, the two thus enclosing between them a vertical series of three prominent white spots. Hind wing: a terminal series of black spots at the apices of the veins, these spots elongate and prominent anteriorly, obsolescent and diffuse posteriorly. *Under-*

side, fore wing: white, apex from above an oblique line that passes through base of vein 6, ochraceous; a very diffuse black-irrorated, curved, oblique band from costa to termen borders the ochraceous apex; in most specimens this is obsolete or only a trace of it is to be seen; a prominent large quadrate black postdiscal spot in interspace 3 and a greenish-yellow tinge at base of wing. Hind wing: entirely ochraceous yellow.—♀. *Upperside*: white. Fore wing: base up to and a little beyond middle of cell thickly irrorated with black scales which gives these parts a dark grey appearance; costa and a little more than the apical half of the wing jet-black; the inner margin of the black irregular, formed into a square angular projection on vein 3, thence it extends outwards along that vein, crosses transversely to vein 2, below which it projects inwards diffusely in interspace 1 and thence extends obliquely outwards to the dorsum; finally there is an oblique pre-apical line of four white spots in pairs enclosed within the black area. Hind wing: the base and a broad band to the tornus thickly irrorated with black scales; terminal third of the wing black, the inner margin of the black area curved and diffuse a slight yellowish-green tinge on dorsal margin and at base. *Underside*: similar to the upperside, but the cell except at its lower apical portion yellowish green; apical area broadly nacreous blue, tinged at the extreme apex with greenish. Hind wing: nacreous blue, sometimes pink, the veins and the terminal margin narrowly and diffusely bordered by greenish yellow; curved postdiscal and subterminal ill-defined and irregular broad bands purplish black. Antennæ black speckled with white; head and thorax in ♂ with bluish-grey, in ♀ with greyish-green long hairs; abdomen greyish black; beneath: thorax yellow, abdomen white. Anal tufts in ♂ brown.

Dry-season brood.—♂. *Upperside*: similar to that of the wet-season specimens, but the black markings on fore wing much restricted and often diffuse; the postdiscal, short, black band and the black spot in interspace 3 often only indicated by a few diffuse scales. On the hind wing the terminal series of spots is much less prominent. *Underside*: as in the wet-season form but of the black markings only the square black spot in interspace 3 is left.—♀. *Upper* and *under sides*: very similar to those of the wet-season ♂. Extreme dry-season specimens lose the postdiscal short black band on fore wing. Antennæ, head, thorax and abdomen in both sexes as in the ♂ of the wet-season form.

Exp. ♂ ♀ 48–66 mm. (1·9–2·6″).

Hab. Within our limits found in Burma and Tenasserim. I have also seen specimens from Siam, the Malay Peninsula, Java down to Lombok.

619. **Appias wardi,** *Moore* (Catophaga), *J. A. S. B.* 1884, p. 43, ♂ ♀; *Hampson* (Catophaga), *J. A. S. B.* 1888, p. 362; *Watson* (Catophaga), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 499; *Davidson, Bell & Aitken* (Appias—Catophaga), *Jour. Bomb. N. H. Soc.* x,

1897, p. 574; *Butler* (Catophaga), *A. M. N. H.* (7) ii, 1898, p. 398; *de N.*, *J. A. S. B.* 1900, p. 256; *Moore* (Catophaga), *Lep. Ind.* vii, 1905, p. 3, pl. 552, figs. 1, 1 *a*-1 *i*, ♂ ♀.

Wet-season brood.—♂. *Upperside*: white. Fore wing: base densely and broadly irrorated with black scales which gradually merge along the costa into the black apical area that occupies about one-third of the wing, the inner margin of this area irregular, passing in a curve from costa to vein 4, thence vertically to vein 3 outwards in interspace 2 and irregularly to the dorsum; a curved preapical series of four or five white spots superposed on the black area. Hind wing: slightly irrorated with black scales at base which leave a terminal series of large, somewhat diamond-shaped, black spots at the apices of veins 3 to 7. *Underside*, fore wing: white, apex butter-yellow, a somewhat narrow zigzag curved irregular black band from middle of costa to tornus. Hind wing: uniform butter-yellow.—♀. *Upperside*: somewhat similar to that in the ♂, but differs in the much greater extent of the black area which occupies the outer apical half of the fore wing and on the hind wing forms a broad continuous terminal band; the superposed spots on black area of fore wing reduced to two and the irroration of black scales at the bases of the wings more dense; on the hind wing this latter extends subdorsally to the black terminal margin. *Underside*, fore wing: white, basal half of cell suffused with sulphur-yellow; a very broad curved black band crosses the wing from costa to tornus, the inner margin of this irregular, the outer margin fairly even; apex pearly bluish-white. Hind wing: uniform, pearly bluish-white.

Dry-season brood.—♂. *Upperside*: similar to the wet-season form but on the fore wing the irroration of black scales at base and the black on apical area much restricted, the latter in most specimens has a more or less rubbed appearance; the white preapical spots very ill-defined. Hind wing: entirely white, in some specimens with a faint yellowish tinge. *Underside*, fore wing: white, with a bluish tint broadly along the basal two-thirds of the costal margin; apex butter-yellow; in a few specimens the usual black curved band that crosses the wing is indicated by a few detached black scales but in most it is entirely absent. Hind wing: uniform butter-yellow.—♀. *Upperside*: similar to that in the wet-season form but the black area on both fore and hind wings much restricted just as it is in the ♂. *Underside*: also similar to that of the wet-season form but on the fore wing the curved black band is very much narrower, and the nacreous surface of the hind wing has more or less of a yellowish tinge. In both sexes and in both seasonal forms the antennæ are black minutely speckled with white, the tufted hair on the head and thorax anteriorly greyish green, abdomen white; beneath: head and thorax pale yellowish white, abdomen white.

Exp. ♂ ♀ 65-76 mm. (2·55-3″).

Hab. Southern India: Kanara and the Nilgiris.

Genus **LADE.**

Lade, *de Nicéville, Jour. Bomb. N. H. Soc.* xii, 1898, p. 153; *Moore, Lep. Ind.* vii, 1905, p. i.

Type, *L. lalassis*, Grose-Smith.
Range. Burma and Malay Peninsula.

♂ ♀. Closely resembles the genus *Appias*, but in the fore wing the costa is more convex, the apex strongly curved downwards, falcate. Venation very similar to, almost the same as in *Appias*. Antennæ with the club proportionately longer and narrower. Abdomen ♂: the anal tufts of hair so conspicuous in *Appias* ♂ entirely absent.

So far as is known at present this genus is monotypic, and is found only in Burma and the Malay Peninsula. In general appearance *L. lalassis*, Grose-Smith, very closely resembles the dry-season forms of *Appias lalage*, Doubleday, which also has a more or less falcate fore wing and very similar markings.

620. **Lade lalassis,** *Grose-Smith* (Appias), *A. M. N. H.* (5) xx, 1887, p. 265; *id. & Kirby* (Appias), *Rhop. Exot.* i. 1889, *Pierinæ*, pl. 2, figs. 1, 2, 3, ♂ ♀; *Moore, Lep. Ind.* vii, 1905, p. i, pl. 551, figs. 1, 1 *a*-1 *c*, ♂.
Pieris indroides, *Honrath, Berl. ent. Zeits.* xxxiii, 1889, p. 403.

♂. *Upperside*: very pale creamy-white. Fore wing: a minute black spot on the lower discocellular, apex of wing irrorated densely with black scales. Hind wing: uniform, with merely the trace of a minute black speck on the discocellulars. *Underside*: ground-colour similar; apex of fore and whole surface of hind wing very faintly pink, irrorated more or less with black scales; in addition the black spots on the discocellulars as on the upperside but larger and a large more or less conspicuous round black spot in middle of interspace 3 of the fore wing. Antennæ dark brown, head with dusky-black, thorax with bluish-grey hairs, abdomen black with white scaling on the sides; beneath: the palpi, thorax and abdomen white. ♀ unknown.

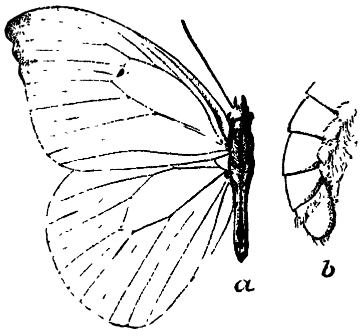

Fig. 54.
a. *Lade lalassis.*
b. Apical abdominal segments.

Exp. ♂ 68–71 mm. (2·7–2·8″).
Hab. Lower Burma; Tenasserim; Malay Peninsula.

The above is a description of the dry-season form; the difference between the dry- and wet-season broods consists, in the latter, of a broadening of the black irroration at apex of fore wing on the upperside, and the appearance on the upperside of the black spot in interspace 3 so conspicuous on the underside.

Genus **SALETARA.**

Saletara, *Distant*, *Rhop. Malayana*, 1885, p. 287.

Type, *S. nathalia*, Felder, from the Philippines.

Range. Malayan Subregion, extending to the Nicobars.

♂. Fore wing: costa very nearly straight; apex acute; termen straight, slightly convex posteriorly, passing with an even curve into the rounded tornus; dorsum straight; cell long, more than half length of wing; venation much as in *Appias*, but middle discocellular proportionately shorter, somewhat as in *A. lalage* and allies; vein 8 absent, vein 9 out of 7 very close to apex, much more so than in *Appias*. Hind wing: as in *Appias*, but the cell proportionately longer.—♀. Fore and hind wings: as in ♂, but apex of fore wing more blunt, and vein 9 as well as vein 8 absent. Antennæ, palpi, head, thorax and abdomen in both sexes as in *Appias*.

Within our limits only a single form has been recorded.

621. **Saletara chrysæa** (Pl. XVII, figs. 14, 15, ♂ ♀), *Fruhstorfer* (S. panda *subsp.* chrysæa), *Soc. Ent.* 1903, p. 124; *Moore, Lep. Ind.* vii, 1905, p. 15, pl. 558, figs. 1, 1 *a*–1 *c*, ♂ ♀.

♂. *Upperside*, fore wing: pale sulphur-yellow, darker yellow towards the tornus; base irrorated with black scales; costa narrowly, termen more broadly black, the black edging not extended to the tornal angle. Hind wing: rich chrome-yellow, fading to sulphur along the dorsum; base slightly irrorated with black scales. *Underside*: rich cadmium-yellow, basal third of costa of fore and upper part of dorsal margin of hind wing slightly paler. Antennæ black, speckled on the inner side with white; palpi and head in front yellow, mixed with dusky-black hairs, head above greenish, thorax with bluish-grey hairs, abdomen yellowish white; beneath: thorax yellowish, abdomen white, anal tufts dark brown.—♀. *Upperside*: rich cadmium-yellow. Fore wing: base very broadly to near apex of cell irrorated with black scales; the costa, the apex very broadly and terminal fourth of wing jet-black. Hind wing: base and a broad band to tornus irrorated with black scales; costa pale sulphur-yellow; termen somewhat broadly black, the inner margin of the black area diffuse; cilia anteriorly yellow, posteriorly black; dorsum broadly white. *Underside*, fore wing: basal two-thirds dull yellow, costa suffused basally with dusky black, dorsum whitish; a postdiscal, evenly curved, black band crosses from vein 7 to tornus and is edged outwardly in the middle with white, beyond the latter edging the costa, apex and termen rich yellow. Hind wing: pinkish, somewhat pearly white, edged along the costa and termen down to the tornal angle with yellow. Antennæ, head, thorax and abdomen as in the ♂ but darker; the abdomen, of course, without anal tufts.

Exp. ♂ 60, ♀ 56 mm. (2·36–2·2″).

Hab. Recorded only from the Nicobars.

Genus **CATOPSILIA.**

Catopsilia, *Hübner, Verz. bek. Schmett.* 1816, p. 98; *Kirby, Allen's Nat. Hist., Butt.* ii, 1896, p. 225; *Aurivillius, Kongl. Svensk. Vet.-Akad. Handl.* xxxi, 1898, p. 448.

Callidryas, pt., *Doubleday, Gen. Di. Lep.* 1847, p. 66.

Callidryas, *Moore* (*nec Boisduval*), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 55.

Type, *C. crocale*, Cramer, from India.

Range. Indo- and Austro-Malayan Regions.

♂ ♀. Fore wing elongate; costa regularly and widely arched; apex moderately acute; termen short, slightly concave; tornus obtuse; dorsum long, about four-fifths the length of costa; cell less than half length of wing; vein 6 from a little beyond apex of basal third of 7, upper discocellular therefore absent; middle discocellular oblique, lower nearly vertical, attenuated in the middle; vein 8 absent; vein 9 from base of apical fourth of 7, terminated on costa just before apex of wing; vein 10 from a little before upper apex of cell; vein 11 widely separated from 10 at base. Hind wing very broad; costa strongly arched; apex not well marked; termen very slightly arched; tornus angular, well marked; dorsum almost straight from base, slightly concave near apex; cell short and broad, middle and lower discocellulars slightly oblique, the latter attenuate in its upper half; vein 8 strongly angular near base; precostal vein rudimentary. Antennæ short and stout, not half length of fore wing; club long and gradual, truncate at apex; palpi short, subporrect, stout, densely scaled, third joint short; body and abdomen robust. Males with secondary sexual characters; on the fore wing a tuft or fringe of long hairs that are directed forwards on the underside of the dorsal margin, near the base; also on the upperside of the hind wing a small patch of specialized scales (*androconia*) just above the subcostal vein.

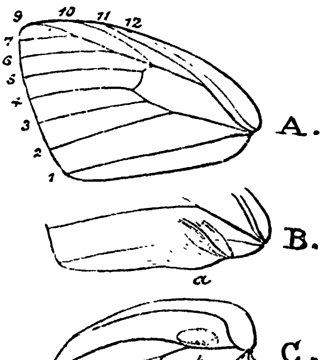

Fig. 55.—*Catopsilia.*
A. Venation fore wing.
B. ♂ sex-mark fore wing.
C. „ „ hind wing.

Key to the forms of Catopsilia.

A. Underside: at all seasons devoid of any irrorations of transverse reddish-brown strigæ.	
a. Upperside: ground-colour fore and hind wings concolorous..........................	*C. crocale*, p. 219.
b. Upperside: ground-colour fore wing white, hind wing rich cadmium-yellow..........	*C. scylla*, p. 224.
B. Underside: at all seasons irrorated with transverse reddish-brown strigæ.	
a. Upperside fore wing: band on terminal margin black, not macular, narrowed posteriorly ..	*C. pyranthe*, p. 221.
b. Upperside fore wing: band on terminal margin reddish-brown, rarely black, always more or less macular, not narrowed posteriorly ..	*C. florella*, p. 223.

622. **Catopsilia crocale**, *Cramer* (Papilio), *Pap. Exot.* i, 1775, pl. 55, figs. C, D, ♀ ; *Hübner, Verz. bek. Schmett.* 1816, p. 98; *Moore, Lep. Ceyl.* i, 1881, p. 122, pl. 48, figs. 1, 1 *a*, 1 *b*, ♂ ♀, larva & pupa; *Davidson & Aitken, Jour. Bomb. N. H. Soc* v, 1890, p. 360; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 570; *Mackinnon & de Nicéville, Jour. Bomb. N. H. Soc.* xi, 1898, p. 586; *de Nicéville & Kühn, J. A. S. B.* 1898, p. 271, pl. 1, figs. 5, 5 *a*, 5 *b*, larva & pupa.

Papilio pomona, *Fabr. Syst. Ent.* 1775, p. 479.

Papilio catilla, *Cramer, Pap. Exot.* iii, 1779, pl. 229, figs. D, E, ♀; *Butler* (Catopsilia), *Trans. Linn. Soc.* (2) i, 1877, p. 551; *Moore* (Catopsilia), *Lep. Ceyl.* i, 1881, p. 122, pl. 47, figs. 3, 3 *a*, ♂ ♀ ; *Distant* (Catopsilia), *Rhop. Malay.* 1885, p. 297, pl. 25, figs. 15, 16, ♂ ♀ ; *Davidson & Aitken* (Catopsilia), *Jour. Bomb. N. H. Soc.* v, 1890, p. 361.

Callidryas flava, *Butler, A. M. N. H.* (4) iv, 1869, p. 202; *Staudinger* (Catopsilia), *Exot. Schmett.* i, 1885, p. 39.

♂. *Upperside*: chalky-white, sometimes with a more or less broad and clearly defined basal sulphur-yellow area on both fore and hind wings; this sulphur-yellow colour is at times diffused over the whole surface of the wings, though generally it becomes paler towards the terminal margins. Fore wing: the whole, or sometimes only the apical half, of the costa narrowly black, this colour widened out irregularly at the apex; termen widely black at the apex, the colour narrowed posteriorly. This border in some specimens almost reaches the tornus, in others terminates above vein 4; occasionally it is continued posteriorly by a series of black dots at the apices of the veins. Hind wing: generally uniform, unmarked, some specimens bear minute black dots at the apices of the veins. *Underside*: ground-colour very variable, white with a slight to strong ochraceous tinge, greenish white or sulphur-yellow. Fore wing: typically without markings, in some specimens with a patch of sulphur-yellow on either side of base of median nervure; in the very yellow examples the tornal area is often widely greenish white; in others (*C. catilla*, Cramer) it bears a spot variable in size on the discocellulars, this spot has a pearly centre and an outer reddish line. Again, many specimens have an irregular angulated narrow discal reddish line (the colour varies in intensity) that runs from the costa obliquely outwards to vein 7, and then obliquely inwards to vein 2, though this line is often absent in specimens that bear the discocellular spot; apex and termen sometimes very narrowly reddish. Hind wing: typically uniform, without markings; in var. *catilla* there is a single small spot at the end of the cell similar to that on the fore wing, sometimes this spot is much larger with a narrow outer reddish ring, sometimes it is accompanied by a similar spot at base of interspace 5; when two spots are present they may be entirely separate, or their outer rings may coalesce; again, some specimens have a highly irregular discal reddish line (often reduced to a series of minute spots) that extends from the costa to vein 1; finally, the majority of specimens have a series of minute red terminal dots at the apices of the veins.—♀. *Upperside*: ground-colour varies as in the ♂, but sometimes it is chalky white at the bases of the wings, with the terminal margins more or less broadly sulphur-yellow. Fore wing: always with a round, occasionally quadrate, black discocellular spot variable in size; in some specimens the costa is black only towards the apex of the wing, in others broadly black throughout and opposite the apex of cell so widened out as to touch the discocellular spot. In lightly-marked specimens in addition to the discocellular spot, there is only an irregular terminal black band dentate inwardly and widest at the apex of the wing; in others there is in addition a more or less diffuse highly-curved macular postdiscal band that extends from the costa obliquely outwards down to vein 7, where it often touches the terminal black band, and thence is continued downward and slightly inclined inwards to interspace 1, getting gradually paler and fainter posteriorly. Hind wing: a series of terminal interspacial black spots that vary in size, and in the dark forms coalesce into a terminal black band. *Underside*: varies from white with a light yellowish sometimes ochraceous tinge to deep chrome-yellow; markings as in the ♂, but still more variable; in var. *catilla* the spot at the apex of the cell in both fore and hind wings is enlarged into a large reddish blotch, the similar spot on the hind wing is sometimes so enlarged as to occupy the apex of the cell, the basal two-thirds of interspaces 4, 5 and 6, and the middle third of interspace 7; in some specimens it is continued posteriorly in a series of obscure lunules to interspace 1 *a*. Antennæ red, obscurely dotted with black, palpi and head above red, thorax clothed with long yellow, sometimes greenish hairs, abdomen pale yellow; beneath: palpi and thorax pale to dark yellow, abdomen white.

Exp. ♂ ♀ 46–87 mm. (1·8–3·4″).

Hab. Nearly throughout our limits, except in the desert tracts; extending to Siam, China, and the Malayan Subregion to Australia.

Larva. Mr. Bell describes the larva of *C. catilla* = *C. crocale* thus:—"The head is round, green, the clypeus edged with brown, covered with small shiny black tubercles which . . . . . do not hide the colour of the head; the anal flap is rounded, but looks square at the extremity, and is covered with rows of small black tubercles . . . . of which only the row along the spiracular line is conspicuous. The spiracles are oval, shiny and white. The colour is green with a spiracular white band touched with bright yellow on segments 2–5, and these segments, especially 3 and 4, are distinctly flanged on the spiracular line as in the larva of *Hebomoia australis*, Butler, though not to so great an extent. Length 51 mm."

Pupa. "The pupa is the same as that of *C. crocale** at first sight, but the dorsal line of the thorax is absolutely parallel to the longitudinal axis of the pupa for two-thirds of its length, consequently the hinder part just before the margin is perpendicular to this part, *i. e.* is raised suddenly but very slightly above the front margin of segment 4, and the front end of this parallel dorsal line is at an angle, and a sharpish angle, with the front slope of the thorax . . . . the cremaster is distinctly bifid at the extremity, and has some shiny, very stout, black, suspensory hooks dorsally as well as at the extremity. There is a dorsal rugose black tip to the snout terminating the head, which snout is cylindrical in its apical half; there is no black line round the eye as in *C. crocale*, and there is a dark green-blue dorsal line which is yellow on the thorax as well as the supra-spiracular yellow line. Length 34 mm.; length of snout 3 mm.; breadth at segment 7 is 9 mm.; height at apex of curve of wings (segment 6) 10 mm., height at the apex of the thorax 8 mm." (*Bell.*)

623. **Catopsilia pyranthe**, *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 469; *Donovan* (Papilio), *Ins. China*, 1798, pl. 32, fig. 1 ♂; *Moore* (Callidryas), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 56, pl. 1, figs. 8, 8 *a*, larva & pupa; *Kirby*, *Trans. Ent. Soc.* 1872, p. 113; *Moore*, *Lep. Ceyl.* i, 1881, p. 124, pl. 47, figs. 2, 2 *a*, ♂ ♀; *Davidson & Aitken*, *Jour. Bomb. N. H. Soc.* v, 1890, p. 360; *Mackinnon & de Nicéville*, *Jour. Bomb. N. H. Soc.* xi, 1898, p. 586.

Papilio chryseis, *Drury*, *Ill. Ex. Ent.* i, 1773, pl. 12, figs. 3, 4, ♂; *Butler* (Catopsilia), *Trans. Linn. Soc.* (2) i, 1877, pp. 551, 557; *Moore* (Catopsilia), *Lep. Ceyl.* i, 1881, p. 125, pl. 48, figs. 3, 3 *a*, ♂ ♀; *Distant* (Catopsilia), *Rhop. Malay.* 1885, p. 300, pl. 25, figs. 1, 2, ♀ ♂, & pl. 26, fig. 20 ♀ var.

Papilio gnoma, *Fabr. Syst. Ent. App.* 1775, p. 828; *Butler* (Catopsilia), *P. Z. S.* 1877, p. 814; *Moore* (Catopsilia), *Lep. Ceyl.* i, 1881, p. 123, pl. 48, figs. 2, 2 *a*, ♀, larva & pupa.

♂. *Upperside*: chalky-white, slightly tinted in some specimens with green. Fore wing: with or without a discocellular black spot, that varies in size; costa and termen sometimes without a black margin; occasionally the costa has its apical third narrowly black, broadened slightly at the apex with black spots between the anterior veins; or again, the costa may be narrowly black, the apex very broadly so, and this colour continued down the termen but narrowed posteriorly. Hind wing: sometimes immaculate, but generally with narrow terminal black spots at the apices of the veins, these often reduced to mere dots, or again so broadened as to coalesce into a narrow terminal black margin. *Underside*: ground-colour similar, suffused on the anterior half of the fore and over the whole surface of the hind wing with a greenish tint that varies to an ochraceous yellow, and, except in the very palest specimens, is evenly irrorated over the greenish or ochraceous-tinted areas with transverse, short, reddish-brown strigæ; both fore and hind wings with generally an obscure discocellular reddish-brown spot or indication thereof.—♀. *Upperside*: as in the ♂, but sometimes with a suffusion of pale greenish yellow on the terminal third or fourth only of both fore and hind wings, rarely of that tint throughout. Fore wing: always with a discocellular black spot that varies very much in size; costa sometimes narrowly black with the basal half pinkish, in other specimens narrowly black throughout, the black broadened at the apex and continued along the anterior half of the termen in a series of inwardly-pointed black spots; or again, the costa may be more broadly black, that colour widened considerably at the apex and continued broadly down the termen to vein 3, then suddenly narrowed to a slender line at the tornus; in most specimens there is an anterior postdiscal short black macular band; in the dark forms this coalesces with the black on apex and termen. Hind wing: sometimes immaculate, sometimes with a series of terminal spots at the apices of the veins, sometimes with a narrow dusky-black terminal band broadest near the apex, narrowed posteriorly to a slender line at the tornus. In the very dark specimens there is in addition an ill-defined, short, anterior postdiscal macular black band. *Underside*: as in the ♂, with similar variations, but in addition in most specimens the discocellular spots are well-defined with an outer red ring that encircles a silvery spot; on the hind wing one or two similar spots on each side of the discocellulars; generally also both wings are crossed by a transverse postdiscal line of minute red spots, which on the fore wing is confined to the anterior portion, on the hind wing is nearly complete. In both sexes: antennæ reddish, head and thorax anteriorly brown, thorax clothed posteriorly with long white hairs, abdomen white; beneath: the palpi, thorax and abdomen white.

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* Mr. Bell treats *C. catilla* and *C. crocale* as distinct forms.

Exp. ♂ ♀ 52–66 mm. (2·08–2·70″).

Hab. Throughout India; Assam; Burma; Tenasserim; not ascending the Himalayas to above 7000 ft. It extends to China on the east, and as far as Australia southwards.

Larva. "Long, somewhat depressed, rough, green, with a white lateral line and above it a black line more or less conspicuous, formed by minute black shining tubercles. In short, this larva is very like a big specimen of the last (*Terias hecabe*)."

Pupa. "Much stouter (*i.e.* than that of *T. hecabe*), and the keel formed by the wing-cases much less pronounced. The normal colour is pale green with a yellow lateral line. We have never found it on any plant except *Cassia occidentalis*. It habitually rests on the upperside along the midrib, like almost all Pierine larvæ." (*Davidson & Aitken.*)

624. **Catopsilia florella,** *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 479; *Donovan's* (Papilio) *Nat. Rep.* iii, 1825, pl. 90 ♀; *Doubleday* (Callidryas), *Gen. Di. Lep.* i, 1847, p. 67; *Butler* (Callidryas), *Cat. Fabr. Lep. Brit. Mus.* 1869, p. 223; *Aurivillius, Ent. Tijds.* ii, 1881, p. 41; *Butler, A. M. N. H.* (6) vii, 1891, p. 48.

♂. Closely resembles some ♂ specimens of *C. pyranthe* that have the black markings on the fore wing reduced and narrow. The ♀ however, shows a greater difference.

The late Mr. de Nicéville considered the two forms identical, but whether this is so or not can only be tested by careful breeding-experiments. After examining a long series of specimens from Africa, India, and the Malayan Subregion, none of which can be referred to either *C. crocale* or *C. scylla*, the only two other forms that occur within our limits, I find I am able to separate them into two groups: the specimens in one group agree absolutely with the type of *C. florella* in the Banksian Collection in the British Museum; the others differ. The two, if there *are* two distinct forms, cannot be considered geographical races, as in many localities their range is conterminous, nor are they seasonal varieties one of the other, for they have been repeatedly taken together on the same day at the same spot. Of course it is quite possible that *C. florella* is a dimorph of *C. pyranthe*, but clear evidence of this is lacking. The chief points of difference between the two forms are given in parallel columns below:—

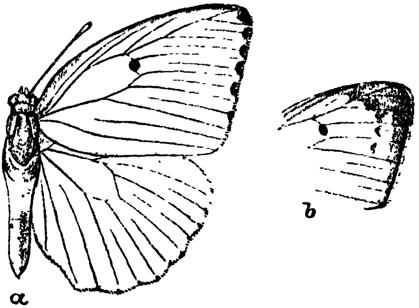

Fig. 56.
a. Catopsilia florella.
b. „ *pyranthe*, fore wing.

C. florella.	*C. pyranthe.*
♂ ♀. *Upperside*: ground-colour white, in ♀ often tinged outwardly with pale primrose-yellow.	♂ ♀. *Upperside*: ground-colour white tinged with greenish, sometimes in ♀ tinged outwardly with greenish yellow.

C. florella (cont.).	*C. pyranthe* (cont.).
♂. *Upperside*: markings on fore wing brownish red, rarely dusky black; on termen always more or less macular, the spots sometimes connected slenderly along the extreme margin, the markings not narrowed posteriorly. Hind wing generally with a very slender terminal yellowish-pink line.	♂. *Upperside*: markings on fore wing always black; on termen not macular but formed into a continuous black band always sensibly narrowed posteriorly. Hind wing with no terminal line, or if present black, sometimes macular, generally ill-defined and diffuse.
♀. *Upperside*: markings as in ♂, the terminal macular band on fore wing not broader.	♀. *Upperside*: markings always much broader than in the ♂; terminal black band sometimes very broad down to vein 3, then suddenly contracted and narrowed to tornal angle.

These differences as enumerated are slight, but they are constant, and give to the two insects a facies markedly different one from the other.

Exp. ♂ ♀ 52–74 mm. (2·06–2·92″).

Hab. Within our limits recorded from the N.W. Himalayas; Dharmsala; Karachi; the Punjab; Sikhim; Bengal; Nilgiris; Western India; Mysore; Assam; Burma; Ceylon. Occurs to the west through a great part of Africa to Sierra Leone in the west, to Nyassaland in the east; Aden; Socotra; Persia and Afghanistan. Further east it is found in Siam and China.

Larva. "Ground-colour pea-green, a black interrupted but very distinct lateral stripe, and below it a broader stripe of an orange-yellow colour; the larva is rough but not hairy, the whole of the back and head covered with minute black spots; length when full grown about 1·5 inches." (*Nurse.*)

Pupa. "Pattern and colouring very like that of the larva, but the green apparently more uniform and (except on the wing-cases) inclining to glaucous; yellow lateral stripe paler; acute cephalic projection tipped with reddish brown; attached to various bushes, grasses, &c." (*Trimen.*)

625. **Catopsilia scylla,** *Linn.* (Papilio) *Cent. Ins.* 1763, p. 20; *Cramer* (Papilio), *Pap. Exot.* i, 1775, pl. 12, figs. C, D, ♂; *Boisduval* (Callidryas), *Sp. Gén. Lép.* i, 1836, p. 631; *Moore* (Callidryas) *Cat. Lep. Mus. E. I. C.* i, 1857, p. 58, pl. 1, figs. 9, 9*a*, larva & pupa; *Butler, Trans. Linn. Soc.* (2) i, 1877, pp. 551, 567; *Distant, Rhop. Malay.* 1885, p. 298, pl. 24, figs. 1, 2, ♂ ♀; *de N. & Martin, J. A. S. B.* 1895, p. 493.

Callidryas gorgophone, *Doubleday, Westw. & Hew. Gen. Di. Lep.* i, 1847, p. 68, pl. 9, fig. 2 ♂.

♂. *Upperside*, fore wing: white, a narrow black line on costa that commences just beyond the base, widens at apex to a broad margin, and is continued down the termen to the tornal angle as an inwardly dentate black band of nearly even width throughout. Hind wing: rich cadmium-yellow, slightly paler towards the base, generally with a series of terminal black spots in the interspaces *Underside*: rich cadmium- or chrome-yellow. Fore wing: a posterior area below cell and vein 2 pure white, the yellow however extends down to the tornal angle in a curve; both fore and hind wings with small discocellular pinkish spots that are ringed with circles of darker brownish-pink scales, and crossed by a series of lunular diffuse discal markings of similar brownish-pink scales. Antennæ and head above reddish brown; thorax clothed with fuscous-grey hairs, abdomen yellow; beneath: palpi, thorax and abdomen yellow.—♀. Similar. *Upperside*, fore wing: ground-colour dull creamy-white, the black on apical portion of costa, on the apex itself and along the termen much broader; a discal series of ill-defined diffuse black spots curved strongly inwards anteriorly and a small discocellular diffuse black ring. Hind wing: as in the ♂, the yellow of a duller shade that turns to pale pinkish white towards basal area above the cell; a discal series, sometimes obsolescent, of dull brownish-black lunular markings; the spots in the terminal series much larger and duller in colour than in the ♂. *Underside*: as in the ♂, but all the black markings of the upperside replaced in rich pinkish-red tints. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 58–72 mm. (2·26–2·86").

Hab. Within our limits, the extreme south of Tenasserim; extends through the Malayan Subregion to Australia; recorded from China.

Larva. "Dark velvety green, with a yellowish-white lateral streak and some very minute black spots anterior to the streak, the whole surface delicately ringed or indented like a leech." (*Martin.*)

Pupa. "Has a pointed head like that of *C. crocale*, but is shorter and more convex than the slender pupa of that species." (*Martin.*)

Genus **DERCAS**.

Dercas, *Doubleday, Gen. Di. Lep.* 1847, p. 70; *Butler, Cist. Ent.* i, 1870, p. 45, pl. 2, fig. 1; *de Nicéville, A. M. N. H.* (7) ii, 1898, p. 478.

Type, *D verhuelli*, Van der Hoeven, from China.

Range. India; Burma; China; Malay Peninsula; Sumatra; Borneo.

♂ ♀. Fore wing: costa strongly arched, apex shortly produced into an acute point, much more so in the ♀ than in the ♂; termen below apex concave, dentate at apices of veins 4, 5 and 6; tornus forms a blunt right angle; termen very short, about half length of costa; dorsum long, slightly sinuate; cell short and broad, not half length of costa; both middle and lower discocellulars concave, upper absent, middle about half length of lower; veins far apart, vein 6 from basal third of 7, vein 8 absent, vein 9 from base of apical third of 7, vein 10 from apex of cell, vein 11 free, from base of apical third of subcostal. Hind wing: very broad, veins well apart; costa arched: termen angulated and shortly tailed at apex of vein 4, sloped obliquely outwards to that vein, thence obliquely inwards to tornus and again at an angle to the middle of the dorsal margin; cell very short and broad; upper discocellular very short, middle slightly longer, lower very much longer, concave and sloped outwards to lower apex of cell; precostal spur curved inwards. Antennæ very short, less than one-third length of costa of fore wing; club elongate, very gradual, roundly truncate at apex; palpi short, third joint remarkably so; eyes large and prominent.

Key to the forms of Dercas.

a. Termen of hind wing angulated and with a well-marked conspicuous tooth or short tail at apex of vein 4	*D. verhuelli*, p. 226.
b. Termen of hind wing slightly angulated at apex of vein 4, but never produced into a tooth or short tail.	
a'. A conspicuous dark sienna-brown spot in interspace 3 of fore wing...............	*D. lycorias*, p. 227.
b'. No sienna-brown spot in interspace 3 of fore wing	*D. lycorias*, dimorph *decipiens*, p. 228.

626. **Dercas verhuelli,** *Van der Hoeven* (Colias), *Tijdsch. voor Nat. Ges.* v, 1839, p. 341, pl. 8, figs. 3, 4, ♀; *Doubleday* (Gonepteryx), *Gen. Di. Lep.* i, 1847, p. 71, pl. 8, fig. 3 ♂; *Moore*, *P. Z. S.* 1865, p. 760; *Elwes*, *Trans. Ent. Soc.* 1888, p. 414.
Rhodocera lycorias, *Doubleday in Gray's Zool. Misc.* 1842, p. 77, ♀ (*nec* ♂).

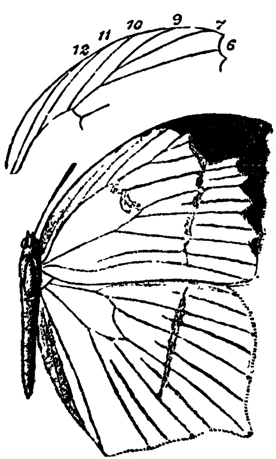

Fig. 57.—*Dercas verhuelli.*

♂. *Upperside*: rich gamboge-yellow. Fore wing: discocellulars bordered on each side broadly with orange; apex with a square patch of dark sienna-brown which is narrowed posteriorly and continued to apex of vein 1; the inner margin of this sienna-brown area angulated in interspace 5, and narrowly edged along its whole length with orange; a narrow band of orange that starts from the angle in interspace 5 and is inclined slightly inwards, crosses the disc of the wing to vein 1. Hind wing: uniform, only slightly paler along the costal and dorsal margins; a minute sienna-brown dot at the apices of all the veins and indications of an orange band in continuation of the one on the fore wing crosses the disc, this is very faint and is merely seen by transparency from the underside. *Underside*: a paler duller yellow. Fore wing: markings much as on the upperside but the edging to the discocellulars, the oblique band across the disc, the square patch at apex and border to the termen are blood-red, but on the termen this colour has a washed-out appearance; in addition there are three red spots on the costa and a more or less triangular streak of silvery scales that crosses the apical patch obliquely. Hind wing: the veins at base of cell, a looped line around the discocellulars, a faint transverse bar near the apex of interspace 7, and the oblique band that crosses the disc reddish, this last extends from vein 1 to vein 7 and is sharply angulated or bent at vein 2. Antennæ brown, head and palpi above pink, thorax and abdomen above and beneath pale yellow.—♀. Similar, with more or less similar markings on both upper and under sides, but the ground-colour is a pale sulphur-yellow, and on the upperside of the fore wing the markings on the discocellulars and the oblique band that crosses the disc are only indicated by transparency from the underside, while the dark sienna-brown on the termen stops short at vein 3, with a spot of the same colour in the interspace below.

Exp. ♂ ♀ 70–82 mm. (2·76–3·22″).

Hab. Sikhim up to 4000 feet; Manipur; the hills of Assam, Burma and Tenasserim; extending to Siam and China.

627. **Dercas lycorias**, *Doubleday* (Rhodocera), *Gray's Zool. Misc.* 1842, p. 77, ♂ (*nec* ♀).

Gonepteryx wallichii, *Doubleday*, *Proc. Ent. Soc.* (1) v, 1849. p. xlvii; *Butler* (Rhodocera), *P. Z. S.* 1866, p. 452; *Elwes* (Dercas), *P. Z. S.* 1882, p. 402; *id.* (Dercas), *Trans. Ent. Soc.* 1888, p. 415.

Gonepteryx urania, *Butler*, *P. Z. S.* 1865, p. 458, pl. 26, fig. 5 ♀; *Swinhoe* (Dercas), *Trans. Ent. Soc.* 1893, p. 308.

Dimorph decipiens.

Dercas decipiens, *de Nicéville*, *A. M. N. H.* (7) ii, 1898, p. 483.
Dercas brindaba, *Swinhoe*, *A. M. N. H.* (7) iii, 1899, p. 107.

♂. *Upperside*, fore wing: sulphur-yellow, darker and a richer yellow on the outer half especially towards the apex; a small square patch on apex trisinuate internally, the middle sinus deep, the others much slighter, dark sienna-brown; a similarly coloured large round spot in interspace 3 and much smaller spots or dots at apices of veins 1 to 3 and 10 to 12. Hind wing: pale yellow, paler along the dorsal and costal margins; veins 1 to 7 with minute dark sienna-brown dots at their apices. *Underside*: paler duller yellow, sprinkled with ferruginous dots; the discocellulars on both fore and hind wings marked with a geminate ferruginous spot bipupilled with silver; a short, oblique, silvery streak on costa just before the apex on fore wing, from which a ferruginous narrow band inclined obliquely inwards crosses the disc, passing through a comparatively large, similarly coloured round spot in interspace 3; a similar band crosses the hind wing, not extended either to the costa or to the tornus; lastly, minute dark spots as on the upperside at the termination of the veins on the hind wing. Antennæ dark reddish brown, palpi in front and head pinkish, thorax dark bluish grey, abdomen pale yellow; beneath: thorax and abdomen pale yellow.—♀. Similar to the ♂ but the ground-colour much paler; the ferruginous spot in interspace 3 of the fore wing larger, especially on the underside.

Exp. ♂ ♀ 58–64 mm. (2·3–2·5″).

Hab. Sikhim; the hills of Assam.

Dimorph *decipiens*, de Nicéville.—The ♂ only appears to be known, I have seen no ♀. The ♂ differs from the typical form in the absence of the spot in interspace 3 of the fore wing, both on the upper and under sides.

Exp. As in the typical form.

Hab. The hills of Assam.

Genus **GONEPTERYX**.

Gonepteryx, *Leach, Edinburgh Encycl.* ix, 1815, p. 128.

Type, *G. rhamni*, Linn., from Europe.

Range. Europe; N. Africa; Asia north of the Himalayas, including Upper Burma, China, and Japan; in the Western Hemisphere, Jamaica, Florida, Venezuela and Brazil, but not in the United States or Canada.

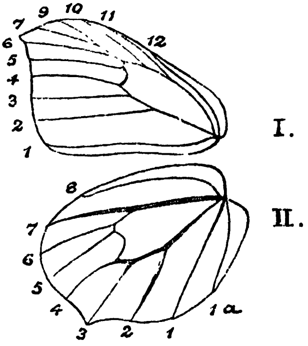

Fig. 58.—*Gonepteryx*, venation.

♂ ♀. Fore wing: costa curved at base, then widely but very slightly emarginate in the middle or straight; apex strongly arched and falcate; termen concave below apex, then convex; tornus broadly rounded; dorsum bisinuate; cell more than half length of wing; vein 6 out of 7 from well beyond apex of cell, upper discocellular absent, middle discocellular very short, not one-quarter the length of the lower, lower deeply concave; vein 5 shifted up, more or less approximate to base of 7; vein 8 absent; 9 from middle of 7; 10 and 11 free, rather wide apart, terminated on costa. Hind wing: broadly oval; termen at apices of veins 7, 2 and 4 slightly, at apex of vein 3 more prominently dentate; subcostal vein and vein 7 swollen, prominent; median vein, veins 1, 2, 3 and 4 towards base and lower discocellular less conspicuously swollen and prominent; cell more than half length of wing, upper discocellular slightly longer than middle, lower longest of all, concave. In cell of fore wing three, in that of hind wing two, of the lost longitudinal veins conspicuously indicated. Antennæ short, about one-third the length of the fore wing; club compressed, gradual but well marked; palpi densely clothed with scales and short hairs, third joint short, blunt; eyes prominent; head tufted above in a peak.

Key to the forms of Gonepteryx.

a. Hind wing: posterior two-thirds of termen arched, only minutely toothed at the apices of the veins.
  a'. Upperside fore and hind wings: ♂ uniform deep cadmium-yellow. ♀ white, barely tinged with cream-colour ...... *G. rhamni*, p. 229.
  b'. Upperside fore and hind wings: ♂, basal area chrome-yellow fading to white, tinged with pale sulphur-yellow on the outer halves or three-fourths. ♀ pale cream-colour .... *G. rhamni*, race *chitralensis*, p. 230.
b. Hind wing: posterior two-thirds of termen prominently dentate at the apices of the veins.
  a'. ♂. Upperside: fore wing chrome-yellow, hind wing cream-colour.—♀, fore and hind wings white, uniformly tinged with pale sulphur-yellow; costa of fore wing slightly emarginate .... *G. zaneka*, p. 230.
  b'. ♂. Upperside: fore and hind wings alike pale chrome-yellow, slightly paler on outer halves of wings.—♀, fore and hind wings white uniformly tinged with sulphur-yellow; costa of fore wing straight .... *G. zaneka*, race *zanekoides*, p. 231.

628. **Gonepteryx rhamni**, *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 470; *Boisduval* (Rhodocera), *Spec. Gén. Lép.* i, 1836, p. 602, pl. 6, fig. 7 ♂; *Elwes* (Rhodocera), *P. Z. S.* 1881, p. 878; *Lang*, *Butt. Eur.* 1884, p. 65, pl. 14, figs. 4 ♂ ♀, pl. 16, figs. 4, larva & pupa; *Doherty*, *J. A. S. B.* 1886, p. 136; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 589.

Rhodocera farinosa, *Zeller*, *Isis*, 1837, p. 5.

Gonepteryx nepalensis, *Doubleday*, *Gen. Di. Lep.* i, 1847, p. 71; *Moore*, *Cat. Lep. E. I. C.* i, 1857, p. 59.

Gonepteryx himalayensis, *Manders*, *Trans. Ent. Soc.* 1890 p. 534.

Race chitralensis.

Colias chitralensis, *Moore*, *Lep. Ind.* vii, 1905, p. 27.

♂. *Upperside*: pale, clear cadmium-yellow. Fore and hind wings: the apices of the veins and in the fore wing the cilia from vein 4 to apex reddish brown; a deep orange spot on the discocellulars of both wings, that on the hind much larger than the spot on the fore wing. *Underside*: very pale yellow with a more or less hoary or floury appearance; the base and disc of the fore wing below a line that would pass longitudinally through the cell sulphur-yellow; discocellular spots on both fore and hind wings dull ferruginous. Antennæ, palpi and head above reddish brown; thorax with dull yellowish-grey hairs, abdomen above black, on the sides yellow; beneath: the palpi, thorax and abdomen yellowish white.—♀. *Upperside*: pale creamy-white, the reddish-brown spots at the apices of the veins, the cilia of the fore wing, and the discocellular spots as in the ♂. *Underside*: white, with a greenish-yellow wash over the anterior third from base to apex of fore and over the whole surface of the hind wing; the spots on the discocellulars of duller reddish brown than on the upperside. Antennæ, palpi, head and thorax as in the ♂; abdomen black above, white on the sides.

Exp. ♂ ♀ 64–70 mm. (2·53–2·76″).

Hab. Within our limits: the whole line of the Himalayas, from Chitral in the extreme north-west to as far east as Darjiling (*fide Moore & de Nicéville*); Upper Burma: the Shan States.

Race **chitralensis**, Moore.—♂ ♀. Very closely resembles the typical form *G. rhamni*, from which it differs structurally in the median vein of the hind wing which is not so prominent, especially on the underside, and in colour as follows:—♂. *Upperside* fore wing: chrome-yellow at base, much lighter in shade than the rich cadmium-yellow of *G. rhamni*, fading on apical half to white faintly tinged with sulphur; hind wing: basal third chrome-yellow fading outwardly to white, more faintly tinged than on the fore wing with pale sulphur. *Underside* fore wing: posterior two-thirds white; anterior third, apical area broadly, and whole surface of hind wing pale salmon-buff with a curious minutely granular appearance.—♀. *Upperside*: as in *rhamni* ♀, but of a more creamy-white. *Underside*: also as in *rhamni* but of rather a salmon-buff tint with a granular appearance.

Exp. ♂ ♀ 52–66 mm. (2·08–2·6″).

Hab. Recorded so far only from Chitral.

629. **Gonepteryx zaneka** (Pl. XVIII, fig. 123), *Moore, P. Z. S.* 1865, p. 493, pl. 31, fig. 18; *Doherty, J. A. S. B.* 1886, p. 136; *Butler, A. M. N. H.* (6) i, 1888, p. 199; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 589.

Race zanekoides.

Gonepteryx zanekoides, *de N., J. A. S. B.* 1897, p. 564, pl. 1, figs. 2, 7, ♂ ♀.

♂. *Upperside*, fore wing: sulphur-yellow, minute spots of reddish brown at the apices of the veins as in *rhamni*, but restricted to the anterior veins; the cilia pale yellow alternated anteriorly with reddish brown. Hind wing: cream-coloured, the posterior veins with minute spots of reddish brown at their apices; ferruginous discocellular spots on both fore and hind wings as in *rhamni* but much duller in tint and very much smaller. *Underside*: darker cream-colour with a slightly greenish tint; posterior two-thirds of the fore wing paler, almost white, anterior third of the fore wing from base through middle of cell to the termen below the apex, and the whole surface of the hind wing with a delicately roughened appearance.—♀. *Upperside*: fore and hind wings cream-coloured with a slightly yellowish tint. *Underside*: greenish white. The rest both on upper and under sides as in the ♂. In both sexes on the *underside* there are some minute black dots, postdiscal series of them anteriorly on the fore wing and across the whole of the hind wing indicate the positions of the lost veins in the interspaces. Antennæ, palpi, head, thorax and abdomen as in *rhamni*, but the long hairs on the thorax above, silky greenish white; beneath: thorax and abdomen paler than in *rhamni*.

Exp. ♂ ♀ 58-62 mm. (2·28-2·46").

Hab. The Himalayas from Chitral to Kumaon at elevations of 6000 to 10,000 feet.

Besides the differences in size and colouring this form and its local race can always be distinguished from *G. rhamni* by the conspicuously scalloped termen of the hind wing; the triangular projection or tooth at apex of vein 3 is also very prominent.

Race **zanekoides**, de Nicéville.—"Very near to *G. zaneka*, Moore, from the Western Himalayas. ♂. Differs from the same sex of that species in having the *fore wing* markedly broader, the costal margin not constricted at half its length but straight, the apex not so produced. *Hind wing*: distinctly broader than in *G. zaneka*, almost of the same shade of brimstone as the fore wing, the outer slightly paler than the basal half of the wing, in *G. zaneka* it is of a pale cream-colour and of a uniform shade throughout.—♀. *Fore wing*: agrees in shape with that of the ♂, consequently differs from the same sex of *G. zaneka* in being broader with a straight instead of an excavated costa, and the apex less produced. *Hind wing*: also broader than in *G. zaneka*. Otherwise similar to *G. zaneka*. The highly dentate wing in both sexes will distinguish *G. zaneka* and *G. zanekoides* from *G. aspasia*, Ménétriés." (*de Nicéville.*)

Exp. ♂ ♀ 41 mm. (2·1").

Hab. Recorded so far only from the Southern Chin Hills, Upper Burma.

Genus **COLIAS**.

Colias*, *Fabr. Illig. Mag.* vi, 1807, p. 284; *Doubleday, Gen. Di. Lep.* 1847, p. 72; *Elwes, Trans. Ent. Soc.* 1880, p. 133; *Lang, Butt. Eur.* 1884, p. 47.

Type, *C. hyale*, Linn., European.

Range. Europe, except the most northern regions; Asia, Northern and Central India, the Himalayas and some of the southern ranges; Northern Africa and the Nearctic Region.

♂ ♀. Fore wing: costa arched at base, then almost straight to apex; apex obtuse; termen slightly convex; tornus obtusely angulate; dorsum straight, about three-fourths the length of the costa; cell about half length of wing; vein 6 out of 7 from just before the middle, upper discocellular therefore absent; middle discocellular short, upright; lower concave, biangulate, the middle portion slender, nearly obsolete; vein 8 absent; vein 9 from apical third of 7; vein 10 from apex of basal third of 7 well beyond apex of cell; vein 11 free, from beyond middle of subcostal. Hind wing: broadly oval; cell more than half length of wing; middle and lower discocellulars oblique, the latter much the longer and irregularly concave, slender in the middle. Antennæ not half length of fore wing, stout; club gradual but well marked, obtuse at apex; head clothed wlth longish hairs in front; palpi stout, porrect, third joint short; eyes large and prominent: body moderately stout; legs with the tarsi long and spiny; claws little curved, bifid, without paronychia or pulvilli.

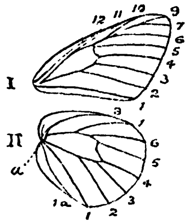

Fig. 59.
Colias, venation.

Key to the forms of Colias.

♂ ♂.

A. Without special sex-marks.
  a. Upperside fore wing: terminal black border traversed by a transverse series of spots, generally of the ground-colour of wing.
    a'. This series of spots incomplete; spot in interspace 3 absent, or rarely, represented by a mere trace.
      a². Upperside: ground-colour lemon-yellow.
        a³. Expanse over 50 mm.; irroration of black scales at base of wings on upperside restricted .... *C. hyale* (typical), p. 234.

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* Fabricius, in his diagnosis of the genus, placed under it the forms *palæno*, *hyale*, *glaucippe*, *rhamni* and *cleopatra*. Latreille in 1809 chose to consider *rhamni* as type of *Colias*, passing over *palæno* and *hyale*. In this he has been followed by Scudder and quite recently by Moore. As this seems to me to unnecessarily upset a familiar name long applied to a certain group of insects, I have not followed Latreille and Scudder.

b^3. Expanse well under 50 mm; irroration of black scales at base of wings on upperside more extensive .... *C. hyale*, race *nilgiriensis*, p. 235.

b^2. Upperside: ground-colour rich chrome-yellow .... *C. hyale*, var. *chrysodona*, p. 235.

b^1. Transverse series of spots complete; spot in interspace 3 invariably present.

a^2. Upperside: ground-colour bright sulphur-yellow.

a^3. Hind wing upperside: black shading on base and disc light not dense, apparently mostly on posterior half of wing; underside fore and hind wings: terminal portions of veins prominently yellow with narrow margins clear of green shading, this gives an appearance of a subterminal transverse series of sublanceolate yellow spots .... *C. ladakensis*, p. 236.

b^3. Hind wing upperside: black shading on base and disc comparatively heavy and dense, extended right up to costal margin; underside fore and hind wings: without a prominent transverse subterminal series of sublanceolate yellow spots .... *C. ladakensis*, race *berylla*, p. 237.

b^2. Upperside: ground-colour pale greenish yellow or pale sulphur-yellow. Expanse over 50 mm.

a^3. Underside fore wing: a discal transverse series of inwardly pointed hastate black spots always present; hind wing: the irroration of black scaling on basal four-fifths outwardly terminated by diffuse black spots in the interspaces .... *C. nastes*, race *leechi*, [p. 238.

b^3. Underside fore wing: without a complete series of discal spots, only one or two round black spots in interspaces 1 and 2; hind wing: the irroration of black scaling on basal four-fifths not terminated outwardly by black spots .... *C. alpherakii*, p. 239.

c^2. Upperside: ground-colour dull orange-yellow. Expanse under 50 mm. .. *C. dubia*, p. 239.

b. Upperside fore wing: terminal black border not traversed by a series of spots, immaculate.

a^1. This black border very broad, not narrowed posteriorly, as broad at dorsum as on costa .... *C. wiskotti*, p. 240.

b'. This black border less broad, distinctly narrowed posteriorly.
  *a*². Upperside: ground-colour lemon-yellow .... *C. hyale*, var. *erate*, [p. 235.
  *b*². Upperside: ground-colour rich orange-vermilion .... *C. eogene*, p. 241.
  *c*². Upperside: ground-colour orange-yellow .... *C. stoliczkana*, p. 242.
B. With special sex-mark of a patch of modified scales at base of interspace 7 on upperside of hind wing .... *C. croceus*, race *fieldi*, [p. 243.

630. **Colia shyale**, *Linn.* (Papilio) *Syst. Nat.* ed. x, i, 1758, p. 469; *Boisduval*, *Spec. Gén. Lép.* i, 1836, p. 650; *Elwes*, *Trans. Ent. Soc.* 1880, p. 137; *Lang*, *Butt. Eur.* 1884, p. 53, pl. 12, figs. 3, ♂ ♀; *Elwes*, *Trans. Ent. Soc.* 1884, p. 23.
Papilio erate, *Esper*, *Ausl. Schmett.* i, pt. 2, 1806?, pl. 119, fig. 3; *Lang* (Colias), *Butt. Eur.* 1884, p. 54, pl. 12, fig. 4; *Elwes* (Colias), *Trans. Ent. Soc.* 1884, pp. 20 & 23.
Colias neriene, *Fischer*, *var.* chrysodona, *Boisduval*, *Gen. Ind. Meth.* 1840, p. 7.
Colias helichta, *Lederer*, *Verh. zool.-bot. Ges. Wien*, ii, 1853, p. 33; *Swinhoe*, *Trans. Ent. Soc.* 1885, p. 343.
Colias sareptensis, *Staudgr. Cat. Lep. Eur.* 1871, p. 5.
Colias lativitta, *Moore*, *P. Z. S.* 1882, p. 255.

Race nilgiriensis (Pl. XVIII, fig. 121).

Colias nilagiriensis, *Felder*, *Wien. ent. Monats.* iii, 1859, p. 395.

♂. *Upperside*: lemon-yellow; costa of fore wing, base of both fore and hind wings and the posterior half of the latter, irrorated with black scales; on the hind wing the black scaling does not extend to the tornal angle. Fore wing: a small oval discocellular black spot; the apex and termen broadly black, broadest on the apex, gradually decreased in width towards the tornal angle, to which in a few specimens it does not quite extend; this black border traversed (sometimes immaculate, eastern dimorph *erate*) by a transverse series of five or six spots of the yellow ground-colour. Hind wing: discocellular spot double and of a deep orange-yellow; terminal margin black, the black forms a continuous band (dimorph *erate*) or is more or less irregular and often interrupted or broken into terminal spots: it extends from vein 2 to apex of wing. *Underside*: lemon-yellow, the base and costa of the fore and the basal half or more of the hind wing very lightly irrorated or sprinkled with black scales. Fore wing: discocellular spot as on the upperside, and a postdiscal transverse series of black spots that decrease in size, curve inwards, and become reddish in colour anteriorly. Hind wing: discocellular double spot silvery, each spot with a slender red inner and outer ring, in some specimens each spot has only the inner ring, and the two together are encircled by an outer slender ring; a postdiscal curved, somewhat obscure series of red spots, of which the subcostal spot is large and prominent. Both fore and hind wings with the cilia and a line on the margins salmon-pink; this line on the fore wing does not reach the tornal angle, on the hind wing it is not extended to the basal half of the dorsum. Antennæ, head and thorax in front more or less salmon-pink, rest of thorax and the abdomen yellow, strongly overlaid with greenish black; beneath: pale yellow, legs pinkish.—♀. Very similar to the ♂ in markings, but the ground-colour on both upper and under sides may be either a paler yellow or white; in both yellow and white forms however, the spots of the ground-colour that traverse the black on the terminal margin of the fore wing are generally larger and sometimes more numerous than in the ♂. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 50–66 mm. (1·99–2·62").

Hab. Within our limits: Baluchistan; the Himalayas from Chitral, Kashmir and Kulu to Bhutan. It extends throughout the Palæarctic Region except the extreme northern portions. It is not found in the Canaries.

Larva. In Europe: "Cylindrical, dark green sprinkled over with black dots; there is a narrow yellow and white lateral stripe. Feeds on *Leguminosæ*, principally *Trifolium*." (*Lang.*)

Pupa. "Green, with a brownish-yellow lateral stripe." (*Lang.*)

Var. *erate*, Esper, seems to be, as noted above, so far as the males are concerned a dimorph of *hyale*. As to the females, in any large series it seems impossible to separate them from those of *hyale*.

Var. *chrysodona*, Boisduval, has been considered by some authorities as a hybrid between *C. hyale* and *C. croceus*, Fourcr. = *edusa*, Fabr. It differs from *hyale*, dimorph *erate*, chiefly in the ground-colour of the wings, which on the upperside are a rich chrome-yellow, not lemon-yellow.

C. helichta, Lederer, is a synonym of *chrysodona*.

Var. *sareptensis*, Staudgr., was diagnosed as follows:—"Al. ant. marg. post. lato nigro; ♂ satur. flavus." The width of the black terminal band on the fore wing is very variable in *hyale*, as is also the depth of the yellow tint in the ground-colour.

C. lativitta, Moore, is a synonym of the dimorph of *hyale*, *C. erate*. The type is in the British Museum, and a close comparison shows that it can be matched by many specimens from S. Russia, where *erate* first begins to make its appearance.

Race **nilgiriensis**, Felder.—Closely resembles typical *hyale*, but as it is isolated in the hills of Southern India it has acquired a distinguishable general appearance.—♂. *Upperside*: ground-colour a deeper, brighter yellow; irroration of black scales at base of fore wing much more extensive and on the hind wing spread right up to the black on terminal margin; terminal black border to both fore and hind wings proportionately broader; on the fore wing traversed as in the typical form by a transverse series of yellow spots. *Underside*: ground-colour a brighter yellow than in *hyale*, but somewhat densely overlaid along the costal margin, on apical area of fore wing and over the whole surface of the hind wing, with a dusting of black scales that gives the underside of the wings a decidedly green tinge. Antennæ, head, thorax and abdomen as in *hyale*, but the latter two somewhat darker on the upperside.— ♀. *Upperside*: ground-colour apparently always white, but so very densely overlaid on the basal third of the fore and over the whole surface of the hind wing with irrorations of black scales, that the insect has a very distinctive appearance when compared with the white dimorphic ♀ of *hyale*; black borders to both wings as in *hyale*, but traversed on the fore wing by only two white spots and on both wings proportionately broader. *Underside*: fore wing white, apex broadly greenish yellow; discocellular and postdiscal spots as in *hyale*. Hind wing: greenish yellow, spots and markings much as in *hyale*. Both sexes always run strikingly smaller than they do in the typical form.

Exp. ♂ ♀ 44–48 mm. (1·74–1·88″).

Hab. Southern India: the Nilgiri and Pulney Hills and Travancore, at 5000 feet.

631. **Colias ladakensis**, *Felder, Novara Reise, Lep.* ii, 1865, p. 197, pl. 27, figs. 8, 9, ♂; *Moore, P. Z. S.* 1882, p. 254; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 589.
Colias shipkee, *Moore, P. Z. S.* 1865, p. 492, pl. 31, fig. 13.

Race berylla.

Colias berylla, *Fawcett, P. Z. S.* 1904, p. 139, pl. 9, fig. 8 ♀; *Elwes, P. Z. S.* 1906, p. 480, pl. 36, fig. 13 ♂.
Colias nina, *Fawcett, P. Z. S.* 1904, p. 140, pl. 9, fig. 9 ♀.

♂. *Upperside*: bright sulphur-yellow. Fore wing: extreme base irrorated with a small patch of black scales; a black discocellular spot; the terminal fourth of wing evenly black from costa to dorsum, the inner margin of the black area curved and not sharply defined, the middle of the area traversed by a series of large, somewhat oval, yellow spots, beyond which right to the terminal margin the veins are slenderly but conspicuously yellow. Hind wing: base and a broad posterior area down to the disc irrorated with black scales, with a sparse clothing at the base of long yellow hairs; an orange-yellow discocellular spot, sometimes wanting; terminal margin towards the apex with broad black border and superposed yellow spots, somewhat as in the fore wing but not at all clearly defined; both the black border and the superposed yellow spots on it fade out posteriorly and are merged in the ground-colour, which extends to the tornal angle and to the margin above it. *Underside*: ground-colour similar but somewhat paler. Fore and hind wings shaded with green as follows:—Fore wing on the costa, the apex and more or less along the terminal margin; hind wing over the whole surface, but most densely over the basal four-fifths. On both fore and hind wings the terminal portions of the veins are prominently yellow with the green shading above and below each vein slightly cleared, this gives to the wings an appearance of markings resembling a transverse subterminal sublanceolate series of bright yellow spots. Fore wing: a black discocellular spot and some postdiscal transverse black markings that decrease in size and become obsolete anteriorly. Hind wing: a large yellow-centred reddish discocellular spot joined to a conspicuous yellow streak in the cell; a slender line along the costal margin of both fore and hind wings and the cilia pink. Antennæ and head salmon-pink; thorax and abdomen greenish yellow; beneath: palpi, thorax and abdomen whitish yellow slightly shaded with dusky black.—♀. Very similar, but the ground-colour is somewhat richer on the upperside; the black border to the fore wing broader and only the posterior veins across it are terminally yellow; on the hind wing the shading of dusky-black scales is more dense. *Underside:* almost as in the ♂.

Exp. ♂ ♀ 50-56 mm. (1·88-2·24″).

Hab. Within our limits: Ladakh and Kashmir, crossing over from Tibet and Chinese Tartary.

Race **berylla,** Fawcett.—♂. *Upperside:* rich bright sulphur-yellow, very pure in tint and very different from the ground-colour of *C. hyale*; also much richer and brighter than in *C. ladakensis.* Fore wing: base posteriorly and for a very short way along the dorsum black; costal margin slightly irrorated with black scales; an oval discocellular jet-black spot; beyond the cell the terminal third of the wing black, in most specimens somewhat diffuse outwardly, the inner margin of the black area irregular, sinuate, and between the veins slightly and diffusely produced inwards; medially this black border to the wings is crossed transversely by a series of more or less elongate spots of the ground-colour in interspaces 1 to 6 and 9 and 10; from each of these spots a very fine slender line is carried nearly to the terminal margin; the spots are well defined, with the exception of those in interspaces 1 and 3, which in some specimens are slightly irrorated with black scales and thus have a tendency to become obscure. Hind wing: dorsum broadly paler, the basal and medial area of the wing right to the costal margin shaded with dusky greenish-black, overlaid near the base by long pale recumbent yellow hairs; this dusky-black area broken by a conspicuous large discocellular spot of the ground-colour, centred with deeper yellow, and a subapical elongate jet-black irregular patch; terminal margin very broadly beyond the dusky-black area, of the shade of the ground-colour, with a very obscure subterminal broad band of irrorated black scales that at the apex of the wing coalesce and form a narrow, short, curved band. Cilia yellow; of the fore wing anteriorly and of the hind wing posteriorly pink. *Underside:* yellow with a rich green tint, especially on the areas that on the upperside are black. Fore wing: discocellular spot and three posterior postdiscal spots in a transverse row that decrease in size towards the costal edge of the wing, jet-black. Hind wing: discocellular spot much smaller than on the upperside and silvery white, the yellow ground-colour prominent on a broad band along the termen. Antennæ bright reddish pink; head, thorax and abdomen black, the head with tufted pinkish hairs anteriorly, the thorax and abdomen shaded with longish dusky hairs; beneath: palpi, thorax and abdomen greenish yellow.—♀. Similar with similar markings. *Upperside*, fore wing: ground-colour from base to terminal black area rich orange-yellow; anteriorly and at base this colour overlaid by dusky-black scattered scales that extend broadly along the costal margin above the cell. Hind wing: as in the male, but the basal and medial areas much darker, almost jet-black; the broad terminal yellow band much shaded with dusky-black scales. On the upperside it has altogether a much darker appearance than the male. *Underside*: as in the ♂ but somewhat paler. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 57–61 mm. (2·24–2·49″).

Hab. Native Sikhim: Tungu Valley, 14,000–15,000 feet; Tibet frontier: Khamba Jong; Gyantse, above 16,000 feet.

632. **Colias nastes**, *Boisduval, Icones Hist. Lép.* pl. 8, figs. 4, 5.

Race leechi.

Colias nastes, *var.* leechii, *Elwes, Jour. Bomb. N. H. Soc.* xi, 1898, p. 466, ♂ ♀.

***Race* leechi**, Elwes.—♂ ♀. *Upperside*: black markings similar to those of *C. ladakensis*, Felder, but the ground-colour quite different, of a pale greenish-yellow in the ♂ and still duller in the ♀, almost a dead sullied white. In no specimen ♂ or ♀ that I have seen is there a discocellular spot on the hind wing. *Underside*: dull greenish white; veins in both fore and hind wings white. Fore wing: a conspicuous discocellular spot as on the upperside and a transverse postdiscal, generally complete series of black spots; the costa, apex and the terminal margin more or less irrorated with black scales. Hind wing: basal four-fifths densely overlaid with irrorated black scaling; along its outer margin this generally ends in a black spot in each interspace; the area covered by the black scales thus acquires a rich dark green tint; a pale streak near apex of cell terminates in a black discocellular spot; the outer terminal fifth covered lightly with yellowish scales, crossing which the terminations of the greenish-white veins stand out conspicuously. Antennæ and head pale pinkish-brown; thorax and abdomen above, the palpi, thorax and abdomen beneath, dusky greenish-white.

Exp. ♂ ♀ 50–54 mm. (1·98–2·12″).

Hab. Chonging Valley and Kardong Pass, Ladakh, at from 15,000 to 17,000 feet.

633. **Colias alpherakii,** *Staudinger, Berl. ent. Zeits.* xxvi, 1882, p. 164; *Gr.-Gr. Rom. Mém.* iv, 1890, p. 337, pl. 3, figs. 2 *a*, 2 *b*, 2 *c*, ♂ ♀.

♂. *Upperside*: pale sulphur-yellow. Fore wing: the base and the veins lightly irrorated with black scales; an oval black spot on the discocellulars; the terminal third of the wing black with the inner border of the black area irregular and diffuse; a transverse subterminal series, that anteriorly is curved backwards, of somewhat rectangular spots of the ground-colour superposed down the middle. Hind wing: the base and central portion irrorated with black scales; a pale discocellular ill-defined spot, and some anterior terminal black markings that vary considerably in extent and are not alike in any two specimens. Cilia of both fore and hind wings prominent and of the same tint as the ground-colour of the wings. *Underside*: ground-colour similar, both fore and hind wings with extensive irroration of black scales which varies considerably in amount: in some specimens it is very dense and gives a blackish tint to the ground-colour, especially on the hind wing. Fore wing: the discocellular spot as on the upperside but much larger; some variable lower discal black markings generally confined to interspaces 1 and 2. Hind wing: uniform, a prominently white round discocellular spot; the terminal margin broadly paler with the irroration of black scales decreasing greatly in density. Antennæ, head, thorax and abdomen concolorous with the ground-tint; the club of the antennæ more or less brownish, sometimes pink.—♀. *Upperside*: ground-colour white, very faintly suffused with yellow; the markings similar to those of the ♂. *Underside*: differs from that of the ♂ as follows:—Fore wing: ground-colour white, the apex suffused with yellow and the irroration of black scales chiefly confined to that area. Hind wing: also white but suffused all over with yellow and with the dusting of black scales, except along the terminal margin, very dense as in some males. Antennæ, head, thorax and abdomen as in the male, but the club of the antennæ in most specimens that I have seen more generally pink.

Exp. ♂ ♀ 49–66 mm. (1·94–2·60").

Hab. Recorded within our limits from Chitral only.

634. **Colias dubia,** *Elwes, P. Z. S.* 1906, p. 481, pl. 36, figs. 8, 9, ♂ ♀.

♂. *Upperside*: orange. Fore wing: base and costa narrowly, apex and termen broadly black; veins and discocellular spot black; very slender, somewhat obscure, subterminal pale yellow streaks cross the black border in each interspace; these start from a transverse series of yellow spots that traverse the inner side of the same border. Hind wing: posterior half dusky greenish, shaded by an irroration of black scales that extends downwards towards the disc under a clothing of long greenish-yellow hairs; a subterminal yellow and a terminal black band, the latter commencing above on the costa and both crossed by the slender pale yellow terminations to the veins which are very conspicuous; the terminal black band narrows posteriorly and becomes obsolete below vein 2. Cilia of both fore and hind wings salmon-pink. *Underside*, fore wing: orange-yellow, costal and terminal margins broadly green; a slenderly white-centred discocellular spot and a transversely postdiscal series of spots, black; veins black, their terminations crossing the green area yellow; costa and termen with a slender pink line. Hind wing: basal four-fifths rich dark green, outer fifth paler brighter green; discocellular spot silvery white, edged, broadly on the outer side, with pinkish red; a curved, transverse, postdiscal series of black spots; the veins from base to termen dark green; costa, termen and dorsum with a slender pink line. Antennæ and head in front pink, club of antennæ brown, thorax and abdomen dusky black; beneath: the abdomen with slender transverse white lines.— ♀. *Upperside*: similar to that of the ♂, but the fore wing with the black shading at the base extended along the dorsum, almost joining the terminal black border which is very much broader and is somewhat obscurely, transversely traversed by a subterminal series of yellow, irregular spots; discocellular spot and veins black. Hind wing: dusky black, a large discocellular spot bright orange and a subterminal transverse band of yellow spots; dorsal margin dark dusky green. *Underside*: much as in the ♂ but the green colour duller and greyer, and the transverse subterminal series of spots not so complete or clearly defined.

Exp. ♂ ♀ 40–45 mm. (1·58–1·78″).

Hab. Native Sikhim; Tibet: Khamba Jong and Lanak Valley, 15,000 to 16,000 feet.

635. **Colias wiskotti**, *Staudinger, Berl. ent. Zeits.* xxvi, 1882, p. 166, pl. 2, figs. 9, 10, ♂ ♀; *Gr.-Gr. Rom. Mém.* iv, 1890, p. 347.

♂. *Upperside*: basal half of both fore and hind wings greenish yellow, of the fore wing very often orange, dusted somewhat sparingly on the fore wing, more closely on the hind wing, with black scales; terminal half opaque black, with the anterior veins on the fore wing and the posterior veins on the hind wing slenderly but conspicuously yellow. In many specimens all the veins are bright yellow where they traverse the black area. Fore wing: the inner margin of the black on the terminal half of the wing irregular, more or less sinuate; an oval black or dark ferruginous-red discocellular spot. Hind wing: the black area on the terminal half almost crescentic in shape, not extended to the tornal area below vein 1; discocellular spot pale orange, large, round and prominent. Cilia pale yellow. *Underside*: pale sulphur-yellow. Fore wing: paler posteriorly; a comparatively large, prominent, blackish-brown, posterior discal spot nearly always present: in some specimens this spot forms the lower one of a discal transverse, always incomplete series of ill-defined similar spots; a blackish-brown spot on the discocellulars as on the upperside, only smaller. Hind wing; ground-colour uniform; a discocellular spot smaller than on the upperside and paler than the ground-colour. Cilia of both fore and hind wings very pale yellow, almost white.—♀. Differs from the ♂ as follows:—*Upperside,* fore wing: ground-colour generally orange, sometimes yellow or even mealy-white; terminal black area much narrower, transversely crossed by a series (often incomplete) of diffuse ill-defined spots of the ground-colour, that is indistinctly produced narrowly along the veins towards the termen. Hind wing: the black on the terminal area very irregular, exceptionally, covering only the apical portion of the wing, often more or less extended towards the tornal area but always broken and interrupted by yellow diffuse spots which in some specimens coalesce and greatly though very irregularly restrict the black area; discocellular spot orange as in the ♂. *Underside*: as in the ♂, but the basal half of the fore wing in most specimens orange. Cilia of both fore and hind wings rose-pink, that colour continued very narrowly along the costal edges of both fore and hind wings and also along the dorsal margin of the latter. In both sexes the antennæ are rose-pink, the head, thorax and abdomen either concolorous with the ground-colour on the basal halves of the wings, or a little paler.

Exp. ♂ ♀ 66–72 mm. (2·60–2·88").

Hab. Within our limits recorded only from Chitral, taken below the Shandur Pass at about 11,000 feet elevation.

636. **Colias eogene**, *Felder, Novara Reise, Lep.* ii, 1865, p. 196, pl. 37, fig. 7 ♂; *Erschoff, Lep. Turkest.* 1874, p. 6; *Lang, Rhop. Eur.* 1884, p. 366; *Groum-Grshimailo, Rom. Mém., Lep.* iv, 1890, p. 329, pl. 5, figs. 1 *a*, 1 *b*, 1 *c*, ♂ ♀.

♂. *Upperside*: rich orange-vermilion. Fore wing: base, an elongate discocellular spot and a very broad band occupying nearly the terminal third of the wing dull opaque black, the last widest at apex, its inner margin curved, irregularly waved and produced narrowly along the dorsum for a short distance. Hind wing: base and a broad area parallel to the dorsum dusky black, clothed with long soft pale hairs; dorsal margin itself narrowly yellowish; a broad, dull, opaque, black band widest in the middle on the termen, its inner margin irregularly sinuate. Cilia of both fore and hind wings salmon-pink. *Underside*: fore wing orange-yellow; the veins from base, the costa somewhat narrowly and the termen more broadly suffused with green; along the termen this colour forms broad expansions at the apices of the veins but is diffuse inwardly; discocellular spot pink centred with white; an obscure, postdiscal, transverse series of black spots, only the posterior two or three prominent; a narrow edging to the costa and the cilia pink. Hind wing: entirely suffused with green; a spot at base of cell, a large double discocellular spot, a narrow edging to the costa and the cilia, pink; the veins more or less conspicuously greyish green; a somewhat obsolescent transverse postdiscal series of dark spots. Antennæ and longish hairs on the head above pink, club of antennæ brownish; thorax and abdomen dusky black; beneath: palpi, thorax and abdomen pale green. No sex-mark on either fore or hind wing.—♀. *Upperside*, fore wing: ground-colour and markings similar to those in the ♂ but the dusky black area at base broader and the terminal black band traversed medially by a transverse complete series of whitish spots tinged with pale vermilion, the series curved inwards opposite the apex and extended quite up to the costa; costa near apex and cilia very broadly orange-vermilion. Hind wing: dusky black; base clothed sparsely with long pale hairs; dorsum broadly yellowish; discocellular spot and an incomplete obscure subterminal series of small spots orange-vermilion; cilia dark pink. *Underside*: very similar to that of the ♂, the colours all somewhat brighter.

Exp. ♂ ♀ 50–56 mm. (1·98–2·2″).

Hab. N.W. Himalayas: Kashmir, Ladak, Chitral; Sikhim: Teesta Valley above 9000 feet; extending into Central Asia through Tibet.

Like many forms of this genus the female is dimorphic; specimens with the ground-colour on the upperside dull white are in the British Museum from the Skoro-la in Baltistan. These differ from typical *eogene* ♂ as follows:—*Upperside*, fore wing: white to pale pinkish white, basal third thickly irrorated with blackish scales; terminal black band as in typical specimens, the spots medially traversing it white with a tendency to become obsolescent; in one specimen, only one or two spots are left. Hind wing: dusky black, the discocellular double spot fleshy pink, the subterminal transverse row of spots more or less obsolete. The pink line on the costa of the fore and the cilia of both fore and hind wings as in typical specimens. *Underside*: like that of ordinary specimens, but the green tints on both fore and hind wings paler and somewhat greyish; the fore wing, except at apex and broadly on anterior portion of termen, greenish white to pale dull pink. There are also aberrations of the ♀ from the Chonging Valley in Ladak, with the colour and markings on the upperside almost as in typical specimens, but on the underside the green tints along the costa on apex and on termen of fore wing and over the whole surface of the hind wing are replaced by grey.

637. **Colias stoliczkana**, *Moore, A. M. N. H.* (5) i, 1878, p. 229; *id. Sci. Res. Yark. Miss.* 1879, p. 4, pl. 1, fig. 1; *Elwes, Jour. Bomb. N. H. Soc.* xi, 1898, pp. 465, 466.
Colias eogene, *var.* stoliczkana, *Alphéraky, Rom. Mém., Lep.* v, 1889, p. 74, pl. 4, figs. 4 *a*, 4 *b*, 4 *c*, ♂ ♀.
? Colias eogene miranda, *Fruhst. Iris*, xvi, 1903, p. 48, pl. 1, figs. 3, 4, ♂ ♀.

♂. Closely resembles in ground-colour and markings ♂ of *C. fieldi*, but differs markedly in size, being always smaller. *Upperside*: black at base of both fore and hind wings, and an irroration of black scales on posterior half of hind wing broader, darker and more conspicuous than in *C. fieldi*. *Underside*: the green colour along the costa and termen of the fore and suffusing the whole surface of the hind wing much darker and richer in tint than in *fieldi*. Antennæ brownish pink; head, thorax and abdomen dusky black; beneath: palpi dusky grey, thorax and abdomen greenish. The sex-mark of modified scales at the base of interspace 7 on the upperside of the hind wing so conspicuous in *fieldi* entirely absent.—♀. *Upperside*: ground-colour sometimes orange-yellow, sometimes white. Fore wing: a discocellular spot and a band occupying nearly the terminal third of the wing black, the latter traversed by a transverse series of more or less equal elongate spots. In the specimens that have the ground-colour orange, these spots and a broad band along the costal margin are bright yellow; in the others the spots are white and there is no band of colour other than the ground-colour along the costa. Hind wing: more or less diffusely irrorated with black scales, those on the apex and terminal margin anteriorly coalesce and form an ill-defined broad black band, which however in all specimens fades out posteriorly, never extending to the tornus; this ill-defined band more or less traversed by a subterminal transverse curved series of elongate spots of the ground-colour; dorsum broadly pale greenish-yellow or white; discocellular spot large and bright orange. In some specimens the irroration of black scales on the posterior two-thirds of the wing gets so sparse towards the termen as to give that portion the appearance of being terminally bright yellow or white. *Underside*: as in the ♂, but the green-coloured areas more greyish green; some specimens with merely a faint trace of that colour; all the veins paler and terminally conspicuously whitish yellow.

Exp. ♂ ♀ 46–56 mm. (1·8–2·2″).

Hab. Described originally from specimens taken by the Second Yarkand Mission north of Changla in Ladak, at 17,000 feet; N.W. Himalayas: Kashmir, Khardong Pass; Sikhim above 15,000 feet.

638. **Colias croceus**, *Fourcroy* (Papilio), *Ent. Paris*, ii, 1785, p. 250.
Papilio edusa, *Fabr. Mant. Ins.* ii, 1787, p. 23.

Race fieldi (Plate XV, fig. 103).

Colias fieldi, *Mén. Cat. Mus. Petr., Lep.* i, 1855, p. 79, pl. 1, fig. 5; *Moore, P. Z. S.* 1874, p. 273; *Elwes, Trans. Ent. Soc.* 1880, p. 136; *id. l. c.* 1884, pp. 5 & 7.

Race **fieldi**, Mén.—♂. *Upperside*: deep cadmium orange-yellow. Fore wing: a patch of greenish-black scales at extreme base, a pear-shaped black spot on the discocellulars and a broad terminal black border; the last occupies about a fourth of the wing and has its inner margin curved slightly and irregularly crenulate, broader at apex and the tornus than in the middle; the end portions of veins 6, 7, 9 and 10 subterminally pale and conspicuous on the black of the apex. Hind wing: a thin covering of long soft hairs at base, beneath which is a dusting of black scales that is continued outwards along the posterior half of the wing; dorsum broadly pale yellow; terminal border broadly black, broadest in the middle, its inner margin crenulate; discocellular spot large, consisting of a small patch on which the ground-colour is paler and brighter and that encloses two somewhat obscure dusky rings, the upper one minute. Cilia of both fore and hind wings broadly salmon-pink. *Underside*: light orange-yellow, the costal margin narrowly, terminal fourth of the fore wing and the whole surface of the hind wing overlaid with pale dull green; the costa, termen and dorsum, with the cilia of both fore and hind wings, salmon-pink. Fore wing: discocellular spot as on the upperside but centred with silvery white; a postdiscal transverse series of black spots, obsolescent and curved inwards anteriorly, conspicuous and increasing in size posteriorly. Hind wing: a discocellular double spot conspicuous silvery and circled by a diffuse salmon-pink ring, followed by a very obscure, almost obsolete, transverse, postdiscal series of pinkish spots. Antennæ, head and thorax anteriorly salmon-pink, club of antennæ darkening to brown; thorax and abdomen dusky greenish black; beneath: palpi, thorax and abdomen yellow. Sex-mark, a patch of thickly set light yellow scales at base of interspace 7 on the upperside of the hind wing.—♀. Differs from the ♂ as follows:—*Upperside*; the irroration of black scales at the base of the wings more extensive, especially on the hind wing; the black on the subterminal margins broader, its inner edge on both fore and hind wings more irregular and somewhat diffuse; on the fore wing the black is transversely traversed by a series of bright yellow spots, the anterior four small, obliquely placed, the posterior one large; on the hind wing the discocellular patch is without the central dark rings conspicuous in the ♂, and there is an obscure postdiscal curved transverse series of yellow spots bordering the black on the terminal margin. *Underside*: precisely similar to that of the ♂. Antennæ, head, thorax and abdomen on the upperside as in the ♂; beneath: the palpi and thorax more or less salmon-pink.

Exp. ♂ ♀ 50–64 mm. (1·98–2·5″).

Hab. The Himalayas from Chitral to Sikhim and Bhutan, from 2500 to 14,000 feet; extending to Assam, Upper Burma and China.

Genus **TERIAS**.*

Terias, *Swainson, Zool. Ill.* i, 1820–21, pl. 22; *Dblday. Gen. Di. Lep.* i, 1847, p. 76; *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 320; *Butler, Cist. Ent.* i, 1870, pp. 35–44.

Type, *T. hecabe*, Linn., from China.

Range. Ethiopian and Indo-Malayan Regions.

♂ ♀. Fore wing: costa arched; apex generally more or less rounded, in a few forms acutely pointed but not produced; termen straight; tornus rounded; dorsum bisinuate, very long, about seven-tenths the length of the costa; cell not quite half length of wing; vein 6 from end of basal fourth of 7, upper discocellular therefore absent; middle discocellular concave, short, half length of lower; lower discocellular long, concave; vein 8 absent, vein 9 from end of basal half of 7; veins 10 and 11 free, from apical half of subcostal, the former given off just before upper apex of cell. Hind wing: broad, broadly oval or slightly pear-shaped; costa arched, apex and termen continuous and strongly curved; tornus obtusely angular, the angle distinct; dorsum broadly arched; cell short and broad at apex; the discocellulars more or less transverse, not oblique, the lower the longest, concave; vein 7 given off from subcostal close to upper apex of cell, vein 8 long, strongly curved at base; precostal vein rudimentary.—♂ with or without sex-marks; in one group on the upperside of the fore wing, in another on the underside of the fore and upperside of the hind wing, in two groups entirely absent.

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* *Eurema*, Hübner, Verz. bek. Schmett. 1816, p. 96, has priority over *Terias*, but I have thought it better to keep to the better-known generic name.

Key to the forms of Terias.

A. Fore wing underside: no markings in basal half of discoidal cell.
  a. ♂ without secondary sexual characters. ♂ and ♀ fore wing: underside without any markings, speckless. Hind wing: upperside without any black terminal edging .. *T. harina*, p. 249.
  b. ♂ without secondary sexual characters. ♂ and ♀ fore wing: underside with two minute black dots on discocellulars ...... *T. libythea*, p. 247.
  c. ♂ with secondary sexual characters on both fore and hind wings. ♂ and ♀ fore wing: underside with a short, black, very slender undivided line on discocellulars.
    a'. Fore wing: acuminate at apex, terminal black band on upperside not extended to tornus .... *T. læta*, p. 248.
    b'. Fore wing: not acuminate at apex, terminal black band on upperside extended to tornus .... *T. venata*, p. 246.
B. Fore wing underside: small black markings in basal half of discoidal cell, or if these are absent then terminal black area on upperside of fore wing dilated into a square spot on tornus. ♂ with secondary sexual characters on fore wing only.
  a. Fore wing underside: two small reddish-brown markings or spots in basal half of discoidal cell .... *T. hecabe*, p. 250.
  b. Fore wing underside: one small black or reddish-brown marking in basal half of discoidal cell.
    a'. Fore wing upperside: inner edge of black terminal area angulated on veins 4 and 7;

outer edge of excavated portion of black area between veins 2 and 4 more or less vertical .... *T. andersoni*, p. 254.

b'. Fore wing upperside: inner edge of black terminal area angulated on vein 4 only, not angulated on vein 7; outer edge of excavated portion of black area distinctly oblique .... *T. sari*, p. 255.

c. Fore wing underside: three small reddish-brown markings or spots in basal half of discoidal cell.

a'. Fore wing: comparatively short and broad, dorsal margin less than four-fifths length of costal margin; inner edge of black terminal area on upperside very irregular, angulated on either vein 7 or vein 4 .. *T. silhetana*, p. 257.

b'. Fore wing: comparatively long and narrow, dorsal margin seven-eighths length of costal margin; inner edge of black terminal area on upperside regular, dentate on each vein, but not angulated. *T. moorei*, p. 259.

639. **Terias venata,** *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 65, pl. 2 *a*, fig. 2; *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 320; *Butler, P. Z. S.* 1871, p. 535; *Elwes, Trans. Ent. Soc.* 1888, p. 414: *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 515; *Butler, A. M. N. H.* (7) i, 1898, p. 64.

Terias sanatana, *Felder, Novara Reise, Lep.* ii, 1865, p. 211.

Terias rama, *Moore, P. Z. S.* 1872, p. 566; *id. Lep. Ceyl.* i, 1881, p. 121, pl. 46, figs. 5, 5 *a*.

Terias pallitana, *Moore, A. M. N. H.* (4) xx, 1877, p. 48.

Terias cingala, *Moore, A. M. N. H.* (4) xx, 1877, p. 48; *id. Lep. Ceyl.* i, 1891, p. 120, pl. 46, figs. 4, 4 *a*, ♂ ♀.

Wet-season brood.—♂. *Upperside*: gamboge-yellow. Fore wing: apical third black, this colour extended along the costa in a gradually narrowing line to the base; the inner margin of the black area irregular, oblique and sinuate from middle of costa to vein 4, thence continued outwards along that vein for a short distance and vertically downwards to vein 2, thence obliquely outwards to the tornal angle; the portion of the area between veins 2 and 4 of even width, slightly produced angularly inwards at veins 2 and 3; basal two-thirds of the wing irrorated with black scales, most dense at extreme base; a single linear black speck on the discocellulars. Hind wing: terminal margin with an even black band and a dusting of black scales from base to tornal angle, parallel with but not extended to the dorsum, nor spreading on to the disc; a small patch of salmon-coloured scales at base of interspace 7. Cilia of both fore and hind wings pale yellow. *Underside*: ground-colour similar but somewhat duller; both fore and hind wings evenly but sparingly dusted with black scales, which do not extend to the cell, disc, or dorsal margin of the fore wing; the last paler yellow with a patch of salmon-coloured scales below the median vein in interspace 2; a linear speck on the discocellulars of the fore wing and a minute dot in interspace 7 of the hind wing black; the disc of the hind wing transversely crossed by two parallel, very obscure, short blackish lunular bands; all the veins of both fore and hind wings with minute black dots at their apices. Antennæ, head, thorax and abdomen dusky black: beneath: the antennæ with a line of white dots; the palpi, thorax and abdomen whitish.—♀. Similar, except of course the special sex-marks. *Upperside*: the dusting of black scales more dense; the black area on the fore wing and the black terminal band on the hind wing broader; the former however, narrowed generally abruptly below the middle of interspace 1 and continued thence to the tornal angle as a mere black line, the latter very broad anteriorly and attenuated rapidly towards the tornus. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen coloured similarly to those of the ♂.

Dry-season brood.—Ground-colour in both sexes clearer, brighter and more free of the irroration of black scales. *Upperside*: the terminal black band on hind wing narrower, of even width in the ♂, obsolescent posteriorly in the ♀. *Underside*: similar but paler than in the wet-season specimens.

Exp. ♂ ♀ 36–42 mm. (1·42–1·67″).

Hab. Himalayas from Simla to Darjiling; Punjab; Ganjam; Western India: Kutch; Bombay; Poona; Southern India: Nilgiri and Anaimalai Hills; Ceylon; Assam; Burma. Nowhere plentiful.

640. **Terias libythea**, *Fabr.* (Papilio) *Ent. Syst. Suppl.* 1798, p. 427; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 515; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 571; *Butler, A. M. N. H.* (7) i, 1898, p. 58; *Mackinnon & de Nicéville, Jour. Bomb. N. H. Soc.* xi, 1898, p. 588.
Terias drona, *Horsfield, Cat. Lep. Mus. E. I. C.* 1829, p. 137, pl. 1, fig. 13; *Moore, Lep. Ceyl.* i, 1881, p. 120, pl. 46, figs. 3, 3 *a*, ♂ ♀.
Terias senna, *Felder, Novara Reise, Lep.* ii, 1865, p. 212; *Distant, Rhop. Malay.* 1885, p. 307, pl. 25, fig. 14 ♀, & pl. 26, fig. 13 ♂; *Manders, Trans. Ent. Soc.* 1890, p. 533.
Terias rubella, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 323; *Elwes, Trans. Ent. Soc.* 1888, p. 413.

This form does not seem subject to seasonal dimorphism or polymorphism in so great a degree as some of the others belonging to the genus *Terias*.

♂. *Upperside*: gamboge-yellow. Fore wing: the apical third black; the inner margin of the black area more or less regularly concave, extends from the apex of the basal third of the costa and curves round to a point on the dorsum just before the tornal angle; base of wing irrorated with black scales. Hind wing: a black terminal band that is broader anteriorly; basal area dusted with black scales. In specimens of the wet-season broods the black-marked areas on both fore and hind wings are broader than in dry-season specimens. Sometimes in the latter the terminal band is broken into a series of linear spots posteriorly. *Underside*: ground-colour similar. Fore wing: costa narrowly edged with pink; two well-marked discocellular and some obscure preapical black specks. Hind wing: a small spot at base followed by three transversely-placed spots and an elongated delicate loop-like discocellular spot, black; above and below the discocellular spot are small black-scaled diffuse spots and beyond the cell on the disc, transverse short diffuse similar bands of black scales placed *en échelon*. The apices of the veins in both fore and hind wings with black spots; cilia salmon-pink. Antennæ, head, thorax and abdomen dusky black, the thorax with some yellow hairs; beneath: the palpi, thorax and abdomen whitish yellow.—♀. Similar, but the terminal band on the upperside proportionately broader both in the wet- and dry-season broods.

Exp. ♂ ♀ 32–44 mm. (1·26–1·72″).

Hab. The Himalayas from Kangra and Simla to Bhutan; Punjab; Bengal; Ganjam; Western India: Poona; Southern India: the Nilgiris and Anaimalai Hills; Ceylon; Assam; Burma; Tenasserim; the Nicobars?

I have only seen a single specimen said to be from the Nicobars.

Many specimens of var. *senna*, Felder, are superficially very different in appearance. They are much larger, very heavily marked on the upperside, the black of a deep intense tint, and the terminal band on the hind wing very broad, well-defined and conspicuous.

641. **Terias læta**, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 674; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 514; *Butler, A. M. N. H.* (7) i, 1898, p. 65; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 588.

Terias jægeri, *Ménétriés, Cat. Mus. Petrop., Lep.* i, 1855, p. 84, pl. 2, fig. 1.

Terias vagans, *Wallace, P. Z. S.* 1866, p. 357.

♂ ♀. Fore wing: much more pointed at apex than in *T. venata*, termen sharply cut and straight. Seasonal dimorphism in this form shows more definitely in the markings of the under than in those of the upperside. The form differs from *T. venata* as follows:—

♂ ♀. *Upperside*: a richer brighter yellow. Fore wing: basal half of costal margin broadly irrorated with black scales; apical black area as in *T. venata*, but stopping abruptly at vein 2; the tornus, except for a very fine black anticiliary line, yellow. Hind wing: almost uniform, the terminal black band generally conspicuous in *venata* reduced to a black subapical patch and posteriorly to a series of black spots in the wet-season specimens that are entirely absent in specimens taken in the dry season.

Underside. Wet-season brood.—Fore wing: dorsal margin broadly pale, whitish yellow above; the base, discocellular cell-area and disc of the wing rich yellow; costa narrowly edged with pink; costal margin and apex broadly rusty brownish; a single black speck at apex of cell. Hind wing: buff-yellow, overlaid with a more or less dense irroration of rusty brownish-red scales; a minute dot at base of interspace 7 with a minute ring beyond; a series of 4 dark spots transversely cross the wing at middle of cell followed by a transverse dark bar from apex of wing to vein 1. This bar is interrupted in interspace 2, and is succeeded by a much shorter similar bar across interspaces 2 and 3. Cilia of fore and hind wings pink. *Intermediate* form as in the wet-season form, but the rusty brownish-red tint replaced by a pale fleshy buff, often with a mealy appearance.

Dry-season brood.—Ground-colour of both fore and hind wings pale yellow. Fore wing: apex very broadly and the basal half of the costal margin above the costal nervure irrorated with fleshy-pink and brownish scales. Hind wing: its whole surface densely shaded with similarly-coloured scales; longitudinally the wing is crossed by two somewhat diffuse, straight, ferruginous-brown bars, the upper one the longer; above these bars are a few brown somewhat obscure specks and dots on the upper basal half of the wing. Antennæ mealy-yellow, with scattered dusky scales; head with pinkish pubescence; thorax and abdomen black, with scattered yellow hairs and scales; beneath: palpi, thorax and abdomen pale yellowish white.

Exp. ♂ ♀ 36-48 mm. (1·40-1·88").

Hab. Himalayas from the borders of Afghanistan to Bhutan; the Punjab; Western India: Ahmednagar, Karachi, Poona, Bombay; Southern India: the Nilgiri and Anaimalai Hills; Assam; Burma; Tenasserim.

642. **Terias harina**, *Horsfield, Cat. Lep. Mus. E. I. C.* 1829, p. 137; *Distant, Rhop. Malay.* 1885, p. 307, pl. 25, fig. 13 ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 414; *Watson. Jour. Bomb. N. H. Soc.* viii, 1894, p. 509: *Butler, A. M. N. H.* (7) i, 1898, p. 59.

♂ ♀. *Upperside*: clear pale primrose-yellow, very beautiful and pure in tint. Fore wing: apex black, the width of this black varying from 2 mm. in a dry-season ♂ to 6 mm. in a wet-season ♀. In the former it is very shortly and narrowly continued along the termen, in the latter it decreases in width posteriorly, but is continued down to the tornal angle. Hind wing: uniform concolorous throughout. Cilia of both fore and hind wings yellow. *Underside*: a paler yellow, uniform and concolorous throughout. Antennæ black, annulated with white; head and thorax dusky greenish; abdomen yellow; beneath: the palpi dusky black, thorax and abdomen yellow.

Exp. ♂ ♀ 44-54 mm. (1·73-2·12").

Hab. Sikhim; Assam; Burma; Tenasserim; Andamans; extending into the Malayan Subregion.

Varieties occur with the ground-colour entirely white on the upperside.

643. **Terias hecabe** (Pl. XVI, fig. 106), *Linn.* (Papilio) *Syst. Nat.* ed. x. 1758, p. 470; *Edwards* (Papilio), *Glean. Nat. Hist.* i, 1758, pl. 253; *Moore, Lep. Ceyl.* i, 1881, p. 118, pl. 45, figs. 1, 1*a*–1*c*, ♀ ♂ & larva; *Distant, Rhop. Malay.* 1883, p. 304, pl. 26, figs. 11, 15 (*nec* fig. 19); *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 359; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 508–514, pl. 2, fig. 12; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 570, pl. 6, figs. 5, 5 *a*, larva & pupa; *Butler, A. M. N. H.* (7) i, 1898, p. 69.

Terias suava, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 670; *Butler, t. c.* 1898, p. 69.

Terias hecabeoides, *Ménét. Cat. Mus. Petr., Lep.* i, 1855, p. 85, pl. 2, fig. 2; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 70.

Terias nicobarensis, *Felder, Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 480; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias fimbriata, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 323; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias simulata, *Moore, Lep. Ceyl.* i, 1881, p. 119, pl. 45, figs. 2, 2 *a*, 2 *b*; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 70.

Terias excavata, *Moore, P. Z. S.* 1882, p. 252; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 70.

Terias purreea, *Moore, P. Z. S.* 1882, p. 252; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 70.

Terias irregularis, *Moore, P. Z. S.* 1882, p. 253, pl. 12, fig. 3; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias apicalis, *Moore, P. Z. S.* 1882, p. 253, pl. 12, fig. 2; *Watson, t. c.* 1894, p. 511; *Butler, t. c.* 1898, p. 71.

Terias asphodelus, *Butler, P. Z. S.* 1883, p. 151, pl. 24, fig. 13; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias asphodelus, *var.* narcissus, *Butler, P. Z. S.* 1883, p. 151; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias curiosus, *Swinh. P. Z. S.* 1884, p. 508, pl. 47, fig. 3; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 73.

Terias swinhoei, *Butler, A. M. N. H.* (5) xvii, 1886, p. 216; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias simplex, *Butler, A. M. N. H.* (5) xvii, 1886, p. 217, pl. 5, fig. 2; *Watson, t. c.* 1894, p. 510; *Butler, t. c.* 1898, p. 71.

Terias contubernalis, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 46; *Watson, loc. cit.* x, 1896, p. 281; *Butler, t. c.* 1898, p. 70.

Terias patruelis, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 46, pl. 4, fig. 5 ♂; *Watson, loc. cit.* x, 1896, p. 281; *Butler, t. c.* 1898, p. 70.

Terias fraterna, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 46, pl. 4, fig. 6 ♂; *Watson, loc. cit.* x, 1896, p. 282; *Butler, t. c.* 1898, p. 70.

Terias merguiana, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 47, pl. 4, fig. 7 ♂; *Watson, loc. cit.* x, 1896, p. 282; *Butler, t. c.* 1898, p. 70.

Terias kana, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 48, pl. 4, fig. 9 ♂; *Watson, loc. cit.* x, 1896, p. 283; *Butler, t. c.* 1898, p. 73.

Wet-season brood.—♂. *Upperside*: yellow, variable in tint from sulphur to rich lemon-yellow according to locality with a light or heavy rainfall. Fore wing: apex and termen deep black, this colour continued narrowly along the costal margin to base of wing, near which it often becomes diffuse; the inner margin of the black area from costa to vein 4 very oblique and irregular, between veins 2 and 4 excavate on the inner side, this excavation outwardly rounded between the veins and inwardly toothed on vein 3; below vein 2 the black area is suddenly dilated into a square spot which occupies the whole of the tornal angle; the inner margin of this dilatation is variable, in the typical form slightly concave. Hind wing: terminal margin with a narrow black band which is attenuated anteriorly and posteriorly; dorsal margin broadly paler than the ground-colour. *Underside*: yellow, generally a slightly paler shade than that of the upperside, with the following reddish-brown markings:—Fore wing: *two* small spots or specks in basal half of cell and a reniform spot or ring on the discocellulars. Hind wing: a slightly curved subbasal series of three small spots, an irregular slender ring or spot on the discocellulars, followed by a highly irregular, curved, transverse, discal series of spots or specks, some or all of which are often obsolescent. On both fore and hind wings the veins that attain the costal and terminal margins end in minute reddish-brown specks. Antennæ greyish yellow, the club black; head, thorax and abdomen yellow, shaded with fuscous scales; beneath: the palpi, thorax and abdomen yellowish white. The sex-mark seen from above appears as a thickening of the basal half of the median vein on the fore wing.—♀. Very similar, the sex-mark of course absent: the black areas on both fore and hind wings slightly broader, with the inner edge of the black terminal band on the hind wing often diffuse. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similarly coloured.

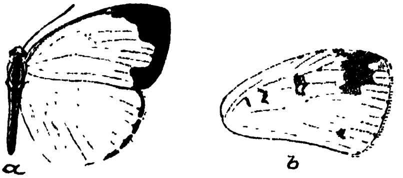

Fig. 60.—*Terias hecabe*.
a. Typical form.
b. Underside fore wing, dry-season brood.

Dry-season brood.—♂ ♀. *Upperside*: ground-colour and markings much as in wet-season specimens, the emargination on the inner side of the black area and the tornal dilatation on the fore wing similar. On the hind wing, in the great majority of individuals, the black terminal band is also similar, in a few it is narrower and diffuse inwardly in both sexes. *Underside*: ground-colour similar to that in wet-season specimens, but in very many with a greater or less irroration of black scales over the yellow parts of the wing; the reddish-brown markings on both fore and hind wings are also similar, but the spots are larger, more clearly defined, darker, and therefore far more conspicuous. In addition, on the fore wing there is a preapical, very prominent, transverse, elongate spot or short bar of reddish brown extended downwards from the costa. This spot is irregular in shape and of variable width, but does not seem ever to spread outwards to the actual edge of the termen. In a few specimens there is also a small reddish-brown spot in interspace 1 near the tornus. Antennæ, head, thorax and abdomen, and in the ♂ the sex-mark, as in wet-season specimens.

Exp. ♂ ♀ 40–55 mm. (1·58–2·18″).

Hab. Throughout our limits, spread eastwards to Siam and China, south far into the Malayan Subregion, and to the west into parts of the Ethiopian Region.

Larva. "Long, green, rough, cylindrical, or slightly depressed, with a large head."

Pupa. "Suspended by the tail and by a moderately long band; the abdominal segments are round, but the thorax is much compressed, the wing-cases uniting to form a deep sharp keel. The head-case terminates in a short pointed snout. Ordinarily the pupa is solitary and green, but about the end of last September a boy brought us a dry twig with fourteen pupæ on it, so close together that they almost touched each other, and quite *black* *. We are inclined to think that the withering of their food had caused these fourteen larvæ, which would ordinarily have suspended themselves singly among the leaves on which they were feeding, to migrate in a body in search of a place where they might safely pass the pupa state. Many Pierine and other larvæ seek each other's company at that time. Having selected a dead branch of some neighbouring bush, they acquired the colour of their surroundings, as nearly all Pierine and Papilionine pupæ do to a greater or less extent. A curious circumstance in this case was that all the butterflies, which emerged from those fourteen pupæ, had a large rust-coloured patch on the underside of the apex of the fore wing. *Terias hecabe* was very common at that time, *but we met few with this mark well developed.* The favourite food of this species is *Sesbania aculeata*, a monsoon annual, already mentioned as the food of *Tarucus plinius*. It also feeds readily on *Cassia tora*." (*Davidson & Aitken.*)

The figures of larva and pupa, Jour. Bomb. Nat. Hist. Soc. x, 1897, pl. 6, figs. 5, 5 *a*, represent both as green, with a conspicuous white lateral stripe on each side.

I have quoted in full the above very interesting note by Messrs. Davidson and Aitken, and I have put the concluding portion of the last sentence but two into italics, as I wish to draw attention to what I consider is an important point. In the very large series of *Terias* belonging to the *hecabe* group which I have had occasion to examine with great care, I find that so far as the dry-season broods are concerned, *T. hecabe* and all the forms which are here treated as varieties of that insect can be readily separated from *T. silhetana* and all its varieties by the shape of the preapical or apical reddish-brown patch present on the underside of the fore wing. In no specimen of *T. hecabe* or variety of that form that I have seen does this mark spread to the edge of the terminal margin, but is always linear and extended preapically downwards from the costa. In *T. silhetana* and its varieties, on the contrary, it is always large, well developed, and extends, though often somewhat diffusely, to the very edge of the termen below the apex, as in the dry-season specimens of *T. sari* = *T. sodalis* and *T. andersoni*, Moore, which latter two forms, however, differ in the markings of the upperside of the fore wing.

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* These pupæ were afterwards discovered to be those of *T. silhetana*, Wallace, *vide* Jour. Bomb. N. H. Soc. x, 1897, p. 571.

Like all wide-ranging forms *T. hecabe* varies enormously, and consequently has received a host of names. The descriptions above of the imago are taken from specimens picked to match the figure given in Edwards's 'Gleanings of Natural History,' which, according to Professor Aurivillius ('Recensio critica Lepidopterorum Musei Ludovicæ Ulricæ,' 1882, p. 60), represents the typical form of "*Papilio hecabe*," Linné.

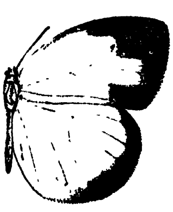
Fig. 61.—*Terias hecabe*, var. *kana*.

Taking the varieties seriatim we have *T. suava*, Boisduval, *T. hecabeoides*, Ménétriés, *T. nicobariensis*, Felder, and *T. kana*, Moore (fig. 61), all of which differ so slightly from typical *hecabe* as to require no separate description. The difference is chiefly one of the width or heaviness of the black markings on the uppersides of the fore and hind wings. The dry-season forms of these are *T. simulata*, Moore, and *T. contubernalis*, Moore.

Var. *merguiana*, Moore (fig. 62 *a*, p. 254), is a wet-season form which differs from *hecabe*, chiefly in the inner margin of the dilated posterior tornal portion of the black area on the upperside of the fore wing. This in *hecabe* is slightly excavate or vertical, in *merguiana* sloped obliquely outwards. The dry-season form of this is *T. excavata*, Moore, from which *T. fraterna*, Moore, is practically inseparable.

Var. *purreea*, Moore = var. *patruelis*, Moore (fig. 62 *c*) and var. *swinhoei*, Butler (fig. 62 *d*), were all described from dry-season specimens, and show a diminishing width of black area on the apex and termen on the upperside of the fore wing and an increasing irregularity in the outline of the inner margin of the same, till in *T. fimbriata*, Wallace = *T. narcissus*, Butler, and *T. irregularis*, Moore = *T. asphodelus*, Butler (fig. 62 *b*), the inner side of the black area becomes more evenly curved, though the actual outline is still somewhat sinuous and often irregularly dentate. The varieties with the least amount of black on the upperside of the fore wing are *T. simplex*, Butler (fig. 62 *e*) and *T. apicalis*, Moore (fig. 62 *f*).

It must be remembered, however, that from the many variations of *T. hecabe* at all seasons, certain specimens can be picked out and be said to represent the wet-season forms of the insects I have here ranked as mere varieties. Such selection is in my opinion entirely arbitrary and negatived by the results of breeding, so far as reliable experiments in this latter have been undertaken.

With regard to the form (*andersoni*) next described I have provisionally kept it separate, but with great doubt. The late

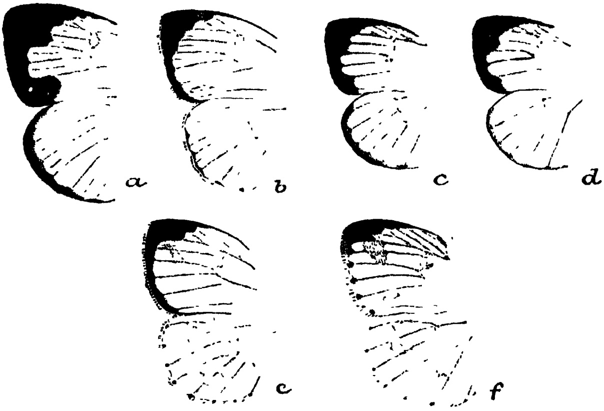

Fig. 62.—Fore wings of varieties of *Terias hecabe.*

a. *Terias hecabe*, var. *merguiana.*
b. *Terias hecabe*, var. *asphodelus.*
c. *Terias hecabe*, var. *patruelis.*
d. *Terias hecabe*, var. *swinhoei.*
e. *Terias hecabe*, var. *simplex.*
f. *Terias hecabe*, var. *apicalis.*

Capt. Watson (*vide* Jour. Bomb. N. H. Soc. x, 1896, p. 282) and the late Mr. de Nicéville (*vide* Jour. Bomb. N. H. Soc. xi, 1898, p. 588), both careful Lepidopterists and not given to unnecessary subdivision of forms, emphatically stated that *T. andersoni*, Moore, was distinct from any form of *T. hecabe*, Linn.

644. **Terias andersoni**, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 47, pl. 4, fig. 8 ♂; *Watson, Jour. Bomb. N. H. Soc.* x, 1896, p. 282; *Butler, A. M. N. H.* (7) i, 1898, p. 70; *Mackinnon & de N. Jour. Bomb. N. H. Soc.* xi, 1898, p. 588.

♂ ♀. *Upperside*: yellow, of a peculiarly pure tint of sulphur, somewhat darker in wet-season specimens, but the different seasonal forms seem to vary little in the shade of the ground-colour or in the shape and character of the markings on the upperside. These latter are similar to those in *Terias hecabe*, var. *merguiana*, Moore, but the black terminal area on the fore wing is intensely black and has its inner margin anteriorly sharply angulated on vein 7, just beyond the upper apex of the discoidal cell, whence the edge of the black area is carried

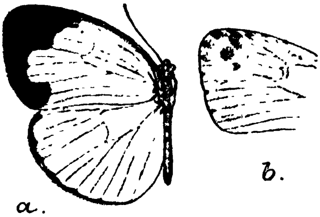

Fig. 63.—*Terias andersoni*, typical.

vertically upwards and joins the narrow black edging on the costal margin, and strongly concavely downwards to its angulation on vein 4; posteriorly the square dilated portion of the black area is sloped obliquely outwards on its inner side. Hind wing: termen narrowly edged with black, which is slightly broader anteriorly. In specimens procured in the height of the dry weather this edging is much narrower. *Underside*: ground-colour slightly paler than on the upperside. Fore wing: in specimens of the wet-season brood, with a single, very slender, short transverse sinuous line in the middle of the cell, a reniform loop of slender lines on the discocellulars and a small spot at the apices of all the veins that end along the costa and termen, jet-black. In specimens intermediate between the wet-season and extreme dry-season forms, and which most nearly resemble the type-specimen, there are, in addition, close to the apex of the wing, two short sinuate transverse black lines, often broken into small spots, placed subapically at right angles with the costal margin. In extreme dry-season specimens these sinuous short vertical lines are replaced by a very large conspicuous inky-black square patch that covers the entire apex of the wing. Hind wing: markings similar to those in *T. hecabe.* Antennæ, head, thorax and abdomen somewhat darker than in *T. hecabe.* In the ♂ the sex-mark similar to that in *T. hecabe.*

Exp. ♂ ♀ 48–53 mm. (1·88–2·07″).

Hab. Tenasserim; S. Andamans.

This form has been recorded also from Mussoorie and Sikhim, but I am very doubtful whether the specimens were correctly identified.

645. **Terias sari,** *Horsfield, Cat. Lep. Mus. E. I. C.* 1829, p. 136; *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 64; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 514; *Butler, A. M. N. H.* (7) i, 1898, p. 73.
Terias sodalis, *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 45.
Terias curiosus, *Swinhoe, P. Z. S.* 1884, p. 508, pl. 47, fig. 3.

The type-specimen belongs to the dry-season brood and can be briefly described as follows:—♂. *Upperside*: pale sulphur-yellow.

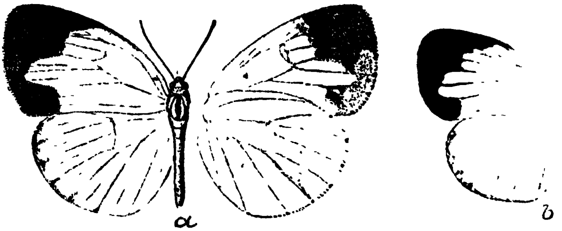

Fig. 64.—*Terias sari.*
a. Typical dry-season brood.
b. Typical wet-season brood.

Fore wing: the black area on the terminal half very similar to that of a heavily marked broad-bordered *T. hecabe*, but the excavated portion on the inner edge between veins 2 and 4 differently shaped (compare figs. 60 & 64 *a*). Hind wing: a broad terminal black band, attenuated anteriorly and posteriorly, diffuse along its inner edge, the terminal portions of the veins that end on the termen also black, that colour carried along the veins for a perceptible distance inwards from the inner edge of the band. *Underside*: ground-colour similar. Fore wing: discoidal cell with a slender, transverse, very short sinuous line in the middle and a reniform loop composed of a fine line on the discocellulars, reddish brown; apex with a large, very conspicuous, square reddish-brown patch that posteriorly is produced triangularly downwards and occupies the entire apex; lastly, a diffuse, irregular, similarly-coloured spot subtornally on the dorsal margin. Hind wing: the markings as in *T. hecabe*, but reddish, very faint and ill-defined. Antennæ, head, thorax and abdomen as in *T. hecabe.*—♀. Similar to the ♂, but the terminal black band on the upperside of the hind wing very diffuse.

Wet-season brood.—♂ ♀. *Upperside*: ground-colour of a deeper shade of yellow. Fore wing: markings similar to those of specimens of the dry-season brood, but the excavated portion on the inner edge of the black area squarer and consequently very closely approximating to that in *T. hecabe* (compare figs. 60 & 64 *b*). Hind wing: as in the dry-season form, but the terminal band much narrower, not diffuse along its inner edge, but dentated at the veins. *Underside*: no trace of the conspicuous square brown patch at the apex of the fore wing, otherwise the markings as in the dry-season specimens, only darker and more clearly defined; all the veins in both fore and hind wings that attain the costal margin in the fore and the terminal in both wings, end each in a small but conspicuous black dot. Antennæ, head, thorax and abdomen, and in the ♂ the sex-mark, as in *T. hecabe*.

Exp. ♂ ♀ 40–48 mm. (1·60–1·88″).

Hab. Ceylon; Southern India: Nilgiri Hills; Burma; Tenasserim; extending far into the Malayan Subregion.

This form is quite possibly one of the many varieties of *Terias hecabe*, but typically the shape of the black terminal markings on the upperside of the fore wing and the large square reddish-brown patch that occupies the whole of the apex on its underside are very distinctive. In the prominence and shape of this latter marking and in the single slender, transverse, short line in the middle of the cell on the underside of the same wing, *T. sari* approximates very closely to *T. andersoni*, Moore, but in the latter form the apical patch is inky-black, not reddish-brown.

T. curiosus, Swinhoe, is an aberration of *T. sari*, in which the black area on the upperside of the fore wing is very broad and of more or less even width posteriorly; the inner edge of the black is very irregular, sinuous and produced dentately inward at more than one point, so that the excavated portion between veins 2 and 4 is, so to speak, merged in the highly irregular line of the inner edge.

646. **Terias silhetana**, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 324; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 509; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1897, p. 571, pl. 6, figs. 6, 6 *a*, larva & pupa; *Butler, A. M. N. H.* (7) i, 1898, p. 71.

Terias citrina, rotundalis et uniformis, *Moore, Lep. Ceyl.* i, 1881, p. 119, pl. 45, figs. 4, 4 *a*, ♀; p. 120, pl. 46, figs. 1, 1 *a*, 1 *b*, ♂ ♀; p. 120, pl. 46, figs. 2, 2 *a*, 2 *b*, ♂ ♀.
Terias vallivolans, *Butler, A. M. N. H.* (5) xi, 1883, p. 420.
Terias heliophila, *Butler, l. c.* xvi, 1885, p. 338, pl. 8, fig. 2.
Terias templetoni, *Butler, l. c.* xvii, 1886, p. 218.

The type is a specimen of the dry-season brood and can be described briefly as follows:— ♂. *Upperside*: rich citron-yellow. Fore wing: markings very similar to those in *T. hecabe* var. *patruelis*, Moore (compare figs. 62 *c* & 65 *a*). Hind wing: ground-colour uniform; a very narrow black terminal line. In the type this is continuous, in other specimens broken and interrupted and in some large specimens intermediate between the dry and wet-season forms, variable in width but distinctly broader than in the type. *Underside*: ground-colour very slightly paler; markings much as in dry-season specimens of *T. hecabe*, but in the fore wing there is *always* an additional minute reddish-brown dot at the extreme base of the cell, and in all typical specimens the apical reddish-brown patch is much larger and spreads diffusely outwards to the termen.

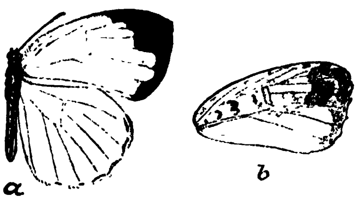

Fig. 65.—*Terias silhetana*.
a. Typical upperside.
b. Fore wing underside.

Wet-season brood.— ♂ ♀. *Upperside*: citron-yellow. Fore wing: markings very similar to those of *T. hecabe* var. *merguiana*, Moore, but the black area broader, especially the dilated, posterior, tornal portion which, though squarer, has its inner edge slightly sloped outwards as in *merguiana* (compare figs. 62 *a* & 66 *a*). The width of the black area is, however, very variable, as are also the size and shape of the dilated posterior portion that occupies the tornal angle. Hind wing: a black band along the terminal margin; this band very variable in width and generally attenuated anteriorly and posteriorly. *Underside*: ground-colour similar; markings very light, similar to those in the wet-season specimens of *T. hecabe*, but *always* with an additional reddish-brown dot at the extreme base of the discoidal cell of the fore wing. Antennæ, head, thorax and abdomen, and in the ♂ the sex-mark, as in *T. hecabe*.

Exp. ♂ ♀ 41–53 mm. (1·63–2·10″).

Hab. Sikhim; Central and Southern India; Assam; Burma; Tenasserim; the Andamans; extending into the Malayan Subregion.

This is almost as puzzling and variable a form as *T. hecabe*. Dry-season specimens can be discriminated from the corresponding specimens of *T. hecabe*, not only by the additional spot in the discoidal cell on the underside of the fore wing, but by the much larger, outwardly diffuse, reddish-brown apical patch on the same wing; but the most careful and repeated examinations of long series have shown me that Capt. Watson was right in stating that the only constant difference between wet-season specimens of *T. hecabe* and *T. silhetana* is the presence in the latter of the additional spot in the discoidal cell of the fore wing, as noted in the key. With regard to the varieties as I deem them of this form, fig. 66 represents the uppersides (*a*) of var. *heliophila*, Butler, and (*b*) of var. *uniformis*, Moore.

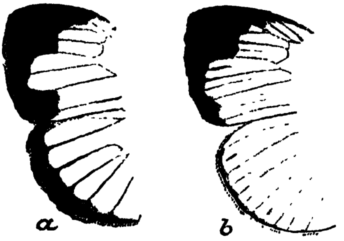

Fig. 66.—*Terias silhetana*, varieties.
a. *T. silhetana*, var. *heliophila*.
b. *T. silhetana*, var. *uniformis*.

Larva. "In describing the larva of *T. hecabe*, Linn., in our former paper, we said that we had got fourteen *black* pupæ all on one dry twig, and so close to each other that they almost touched. We did not distinguish the butterflies which emerged from *T. hecabe*; indeed until the publication of Captain E. Y. Watson's very valuable paper on the synonyms of some species of Indian *Pierinæ* in vol. viii. of this Journal, p. 489 (1894), we made no attempt to sort our specimens under the multitude of names with which Messrs. Butler, Moore and Swinhoe have enriched the genus. We have since discovered, however, that these black pupæ are not to be found on the ordinary food-plants of *T. hecabe*, but on *Wagatea spicata*, and that they result from a gregarious larva with a black head. This leaves no doubt that they belong to a distinct species, and, having compared the butterflies which emerged from a large number of both kinds, we find that those produced from the black-headed larva and the black pupa bear the three dark streaks and spots in the cell, in addition to the reniform spot on the discocellular nervules on the underside of the fore wing, by which Captain Watson separates *T. silhetana* from *T. hecabe*. We have figured the larva and pupa on plate vi, fig. 6, *larva*; 6 *a*, *pupa*." (*Davidson, Bell & Aitken.*)

The figures in the plate represent a slender cylindrical green larva with a conspicuous black head and a yellow ill-defined lateral stripe, and a pupa in shape exactly like that of *T. hecabe* but entirely brownish black in colour.

The form next described Captain Watson considered the wet-season form of *silhetana*, but though like *silhetana* it has three spots or markings in the discoidal cell on the underside of the fore wing, the shape of the wings and the general facies of the insect seem distinct; besides, so far as I know, it has only been taken in the Nicobars. I have, therefore, provisionally kept it separate.

647. **Terias moorei**, *Butler, A. M. N. H.* (5) xvii, 1886, p. 216, pl. 5, fig. 1; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 509; *Butler, A. M. N. H.* (7) i, 1898, p. 72.

♂. *Upperside*: rich deep sulphur-yellow. Fore wing: elongate and narrower than in *T. silhetana*; apex and termen with a narrow, black, inwardly dentate band that broadens slightly on the apex and is continued as a slender line along the costal margin to the base of the wing, close to which it becomes somewhat diffuse and dusky. Hind wing: nearly uniform throughout, the terminal margin with indications of a slender black anticiliary line, which in most specimens is reduced to a series of minute black dots at the ends of the veins. *Underside*: ground-colour similar; markings very similar to those in the wet-season specimens of *T. silhetana*. Antennæ, head, thorax and abdomen as in *T. silhetana*. ♀. Ground-colour and markings on both upper and under sides as in the ♂, with the exception of the black band on the upperside of the fore wing, which in some specimens is slightly broader. Antennæ, head, thorax and abdomen, and in the ♂ the sex-mark, as in the ♂ of *T. silhetana*.

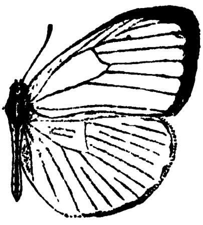
Fig. 67.
Terias moorei.

Exp. ♂ ♀ 47–50 mm. (1·84–2·00").

Hab. The Nicobars.

I am unacquainted with the dry phase of this form, if there be such.

Genus **COLOTIS.**

Aphrodite, *Hübner* (*nec Linn.*, Vermes), *Verz. bek. Schmett.* 1816, p. 95.
Colotis, *Hübner, Verz. bek. Schmett.* 1816, p. 97; *Kirby, in Allen's Nat. Hist., Lep.* ii, 1896, p. 198.
Teracolus, *Swainson, Zool. Ill.* (2) iii, 1823, text to pl. cxv; *Butler, Cist. Ent.* i, 1870, pp. 36 & 47, pl. 2, fig. 6, venation; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 517.
Idmais, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 584.
Callosume, *Doubleday, Gen. Di. Lep.* i, 1847, p. 57.

Type, *C. amata*, Fabr., from Africa and India.

Range. Ethiopian and Indo-Malayan Regions.

♂. Fore wing: costa very slightly arched; apex obtuse, rounded, slightly convex; tornus obtuse but well-marked; dorsum slightly or moderately convex or sinuate, about three-fourths the length of costa; cell about half length of wing; discocellulars: upper absent, middle and lower moderately to strongly concave; vein 6 from upper apex of cell or from a little beyond; vein 8 absent; 9 from a little beyond the middle of 7; 10 and 11 free, emitted moderately close together from apical half of subcostal vein, or the space between them at base equal to the space between base of vein 10 and the upper apex of the cell. Hind wing: costa arched, apex rounded, termen slightly arched, tornus obtuse but well-marked, dorsum slightly convex; cell not half length of wing; lower discocellular oblique, concave; veins 5 and 6 approximate at base, vein 7 emitted from apical half of subcostal; precostal vein inclined outwards. Antennæ short, not half the length of the fore wing, club well-marked, spatulate; head tufted anteriorly; palpi porrect, third joint slender, acute at apex; eyes naked; body moderately robust. The males of certain of the forms in this genus bear patches of specialized scales or androconia, which occur either on the upperside of the hind wing as in the typical form, or as in *fausta* and its nearest allies on the underside of the fore and upperside of the hind wing.

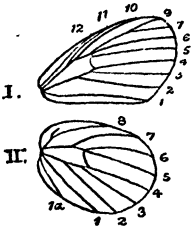

Fig. 68.
Colotis, venation.

The forms arranged under this genus, with the exception, perhaps, of those that belong to the "*hecabe*" group of the genus *Terias*, are of all *Pieridæ* the most variable. Sensitive, as a large majority of the Lepidoptera are when in the pupal state, to slight changes of temperature, moisture, and dryness, the pupæ of the above-mentioned genera seem preeminently so. A slight difference in the rainfall from one week to another, probably even from day to day, in localities where they are found, seems to affect the shade of the ground-colour, the width and prominence or otherwise of the markings on their wings. In the absence, therefore, of careful breeding-experiments, and even of any long series of carefully localized and dated specimens, any conclusions as to the specific distinctness of the forms must necessarily be more or less tentative. No two authorities agree as to the number of distinct forms of *Colotis* that occur, even in a limited fauna such as is dealt with in the present series of handbooks. After a long and careful examination of the tolerably large mass of material contained in the collection of the British Museum, supplemented by those in a few large private collections, I have, I find, independently arrived at much the same conclusions as those set forth in the MSS. left by the late Mr. de Nicéville. I have not, however, adopted his division of *Colotis* into subgenera, as the structural differences between certain of the forms do not seem to me sufficient to warrant such subdivision.

Key to the forms of Colotis.

A. Upperside: ground-colour on fore and hind wings salmon-pink. ♀ dimorphic.
   a. Upperside: ground-colour salmon-pink; in ♀ sometimes white. Terminal black band on hind wing narrow with a more or less obsolescent series of spots of the same tint as the ground-colour of the wing, so arranged as to break up the inner edge of the band .... *C. amata*, p. 261.

b. Upperside: ground-colour always salmon-pink in both sexes. Terminal black band on hind wing broad, immaculate .... *C. protractus*, p. 263.

B. Upperside: ground-colour on fore wing salmon-pink; on hind wing white. In ♀ sometimes both wings entirely white. Terminal black band on hind wing broad .... *C. phisadia*, p. 264.

C. Upperside: ground-colour on fore and hind wings orange-pink. ♀ dimorphic.

- *a*. Upperside fore wing: four or five spots of the ground-colour enclosed in terminal black border.......................... *C. fausta*, p. 266.
- *b*. Upperside fore wing: never more than three spots of the ground-colour enclosed in terminal black border................ *C. fausta*, race *tripuncta*, p. 268.

D. Upperside: ground-colour on fore and hind wings white in both sexes.

- *a*. Upperside fore wing: no orange or carmine markings; hind wing: a broad black immaculate terminal band .... *C. vestalis*, p. 265.
- *b*. Upperside fore wing: orange or carmine apical patch; hind wing: only a series of black terminal spots.
  - *a*'. Upperside fore wing: apical patch orange.
    - a^2. This patch anteriorly not bordered with black on inner side .... *C. eucharis*, p. 268.
    - b^2. This patch bordered with black along the whole of its inner side.
      - a^3. Black border narrow; orange patch comparatively large .... *C. etrida*, p. 270.
      - b^3. Black border broad; orange patch comparatively narrow .... *C. etrida*, race *limbata*, p. 271.
  - *b*'. Upperside fore wing: apical patch carmine.............................. *C. danaë*, p. 271.

648. **Colotis amata**, *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 476; *Butler* (Teracolus), *P. Z. S.* 1876, p. 138; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526; *Kirby in Allen's Nat. Hist., Lep.* ii, 1896, p. 198.

Papilio calais, *Cramer, Pap. Exot.* i, 1775, p. 84, pl. 53, figs. C, D, ♀ form (1), & iv, 1781, pl. 351, figs. A, B, ♂, C, D, ♀ form (2); *Moore* (Idmais), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 67; *Yerbury* (Teracolus), *Jour. Bomb. N. H. Soc.* vii, 1892, p. 214; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526.

Papilio cypræa, *Fabr. Mant. Ins.* ii, 1787, p. 22; *Butler* (Teracolus), *P. Z. S.* 1876, p. 138; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 359; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526.

Pontia dynamene, *Klug, Symb. Phys.* 1829, pl. 6, figs. 17, 18, ♂; *Butler* (Teracolus), *P. Z. S.* 1876, p. 138; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526.

Teracolus modestus, *Butler, P. Z. S.* 1876, p. 137; *Moore* (Idmais), *Lep. Ceyl.* i, 1881, p. 131, pl. 49, figs. 2 ♂, 2 *a* ♀ form (2) *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526.

Teracolus carnifex, *Butler, P. Z. S.* 1876, p. 138, pl. 7, figs. 8, 9, ♂; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 519, 526.
Teracolus kennedii, *Swinhoe, P. Z. S.* 1884, p. 440; *Watson, Jour. Bomb. N. H. Soc.* 1894, pp. 519, 526.

♂. *Upperside*: salmon-pink. Fore wing: costa black, thickly overlaid with greyish or pinkish scales; a black spot at apex of cell, which may be large and quadrate or smaller and lunate; termen broadly black, with an enclosed double transverse series of spots of the ground-colour—the inner series consists of a large spot in interspace 1, two very small spots in interspaces 2 and 3, one in each, and four larger anterior spots placed in a curve; the spots in the outer series are variable in number, but generally there is one in each interspace, these are more or less linear in shape. Hind wing: a band on costal margin extended to just within the upper margin of the cell, covered with dense black specialized scales; this black band joined on to a broad similarly-coloured terminal band of ordinary scales, that becomes more or less diffuse and powdery posteriorly, and encloses a double series of small spots of the ground-colour the inner series often obsolescent, in some specimens entirely absent; dorsum heavily irrorated with fuscous scales, the irroration extended on to the disc, which has therefore generally a greyish appearance. *Underside*: greenish yellow; an anticiliary fine black line on both fore and hind wings; the black markings of the upperside show through by transparency. Fore wing: a black spot, variable in size and intensity, in some specimens absent altogether, at apex of cell; a subterminal quadrate black spot in interspace 1 and another (sometimes faintly marked or absent) further outwards in interspace 2; disc faintly, dorsal margin broadly very pale salmon-pink. Hind wing: the whole surface sparsely irrorated with minute black scales; a small black discocellular spot. Cilia of both fore and hind wings pale salmon-pink. Antennæ, head, thorax and abdomen black, the antennæ speckled with white, the head and thorax covered with greenish-fuscous hairs; beneath: the palpi green, thorax and abdomen white.

♀. *Form* 1. *Upperside*: ground-colour paler than in the ♂, in some specimens quite ochraceous outwardly; all the markings similar, but duller in tint. The hind wing, of course, without the black costal band of specialized scales, the ground-colour extended up to the costal margin. *Underside*: similar to that of the ♂, but the ground-colour very much paler and more ochraceous than green. In some specimens, in addition to the black spots in interspaces 1 and 2 on fore wing, there is an anterior postdiscal fuscous curved band. Hind wing: discocellular spot larger than in the ♂ and annular; a curved discal series of reddish spots from costa to dorsum.

♀. *Form* 2. Similar to ♀ form 1, but the ground-colour pale primrose-yellow to pure white. Antennæ, head, thorax and abdomen in both forms much as in the ♂.

Exp. ♂ ♀ 40–50 mm. (1·56–2·00″).

Hab. Within our limits, continental and peninsular India, but not Bengal; Ceylon. Outside our limits this form is found in Aden and probably throughout Arabia, in Madagascar and Tropical Africa.

Larva. "Very like that of *Terias*, cylindrical or slightly depressed with a rough surface due to minute tubercles, from each of which grows a very small bristle. The colour is a uniform grass-green, with a blue dorsal line more or less distinct, and a yellowish lateral line dividing the colour of the back from the paler green of the underparts." (*Davidson & Aitken.*)

Pupa. "Compressed; wing-cases produced into a keel like that of *Terias*. It is suspended in the same manner by the tail and a moderately long band. The colour is usually some shade of dingy whitish brown or dirty green." (*Davidson & Aitken.*)

649. **Colotis protractus**, *Butler* (Teracolus), *P. Z. S.* 1876, p. 137; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1874, pp. 520, 526.

♂. *Upperside*: rich salmon-pink. Fore wing: base bluish grey; a band along the costal margin black and joined on to a very broad similarly-coloured band on termen that occupies the outer fourth of the wing; inner margin of terminal band irregular, extended slightly and squarely inwards in interspaces 1 *a*, 1 and 3; a prominent oval black discocellular spot extended downwards from the black on the costal margin; apex with elongate bluish-grey spots in interspaces 3, 4, 5, 6 and 9 superposed on the black terminal band. Hind wing: dorsum white, terminal half of wing jet-black; a somewhat diffuse subdorsal band of bluish-grey scales from base to the black on terminal margin. *Underside*: a beautiful light greenish yellow; disc of wings tinged with salmon-pink, conspicuous in the fore, more obscure on the hind wing. Fore wing: a prominent black discocellular spot, and a subterminal series of three more or less quadrate black spots that decrease in size anteriorly in interspaces 1, 2 and 3, the spot in interspace 1 extended into interspace 1 *a* and lengthened posteriorly outward to the terminal margin. Hind wing: uniform. Cilia of both fore and hind wings pale salmon-pink. Antennæ brownish black, ringed or spotted with white; head, thorax and abdomen black, the thorax anteriorly with whitish hairs at the sides; beneath: the palpi, thorax and abdomen pale yellow. Sex-mark: a small glandular patch of scales near the base of interspace 1 on the underside of the fore wing, sometimes visible on the upperside.—♀. *Upperside*: ground-colour similar; the markings similar, but the black along the costa and termen of fore wing and on terminal half of hind wing dark silky brown; on the fore wing edged interiorly along the costa and along the termen from vein 2 upwards with jet-black; discocellular black spot on fore wing much larger than in the ♂. *Underside*, fore wing: base and cell anteriorly greenish yellow, disc salmon-pink; apex and termen broadly dull ochraceous pink; discocellular and posterior subterminal spots much as in the ♂. Hind wing: uniform ochraceous pink. Antennæ, head, thorax and abdomen as in the ♂, but somewhat duller in colour.

Exp. ♂ ♀ 38–50 mm. (1·50–2·00").

Hab. Baluchistan; the Punjab; Cutch.

650. **Colotis phisadia**, *Godart* (Pieris), *Enc. Méth.* ix, 1819, p. 132; *Boisduval* (Idmais), *Sp. Gén. Lép.* i, 1836, p. 587; *Butler* (Teracolus), *P. Z. S.* 1876, p. 136; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, p. 520; *Butler* (Teracolus), *P. Z. S.* 1896, p. 245, pl. 10, fig. 13, pupa.

Pontia arne, *Klug, Symb. Phys.* 1829, pl. 7, figs. 1–4, ♂ ♀; *Butler* (Teracolus), *A. M. N. H.* (4) xviii, 1876, p. 487; *Manders* (Teracolus), *Ent. Month. Mag.* xxvi, 1890, p. 16.

Idmais philamene, *Mabille, Comptes Rend. Soc. Ent. Belg.* xxiii, 1880, p. cvi.

♂. *Upperside*, fore wing: pale salmon-pink, this colour paler outwardly; base heavily irrorated with bluish-grey scales that extend outwards and are merged with a black patch that occupies the apex of the cell and spreads along the discocellulars; terminal third of wing black with enclosed spots of the ground-colour in interspaces 3, 4, 5 and 9, the spot in 4 sometimes absent, the inner edge of the black area emarginate at interspaces 2 and 4; the outer margin with a series of minute terminal specks of ground-colour in the interspaces. Hind wing: white, base heavily irrorated with bluish-grey scales that are extended downwards in a diffuse band parallel to the dorsum; terminal half of wing jet-black. *Underside*: precisely like the underside of *C. protractus* ♂. Antennæ, head, thorax and abdomen as in *C. protractus.*— ♀. Very variable, but resembles the ♂ in markings. On the upperside however, the terminal areas on both fore and hind wings that are black in the ♂ are silky-brown on the fore wing, the inner sinuate margin of the same posteriorly black; on the hind wing the terminal brown area encloses an irregular sinuate black band that does not extend either to the costa or the dorsum. The ground-colour of the fore wing in some specimens is faintly pink fading to white outwardly; on the hind wing the ground-colour is white, as in the ♂. In other specimens the ground-colour on both fore and hind wings is entirely white or pinkish orange. *Underside*: as in the ♂, but the apical area of the fore and the whole surface of the hind wing tinged more or less with ochraceous. In many individuals (probably of the dry-season broods) this ochraceous tint is very marked. Fore wing: with posterior black spots as in the ♂. Hind wing: an irregular discal sinuate macular brown band that is often obsolescent. Antennæ, head, thorax and abdomen much as in the ♂.

Exp. ♂ ♀ 38–46 mm. (1·50–1·80").

Hab. The only records of the occurrence of this form within our limits are: a ♂ specimen in the Indian Museum labelled "Surat;" Dr. Manders got a single specimen at Multan in the Punjab; and Mabille gives it, but on what authority I do not know, from "Northern India."

Larva. "Larva feeding on *Salvadora persica.* The following is a description of it:—Pea-green when young, two black spots on the back of the head, a white mark almost the shape of an ace of diamonds, but rather longer, on the second segment; when older, the black spots on the head disappear and the white mark gets clearer and is outlined with black. There are two similar marks just beyond the centre of the back, the front one being the smaller, and another similar mark on the eleventh segment." (*Nurse.*)

Pupa. As figured is stout, pale brown, more or less mottled with darker brown, in shape mainly cylindrical, with the wing-cases moderately developed; the head ends in a very sharp point.

651. **Colotis vestalis,** *Butler* (Teracolus), *P. Z. S.* 1876, p. 135, pl. 7, fig. 10 ♂; *Yerbury* (Teracolus), *Jour. Bomb. N. H. Soc.* vii, 1892, p. 216; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 520, 526; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 390.

Teracolus puellaris, *Butler, P. Z. S.* 1876, p. 136; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 521; *Butler, A. M. N. H.* (6) xx, p. 389.

Teracolus ochreipennis, *Butler, P. Z. S.* 1876, p. 136; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 521, 526; *Butler, A. M. N. H.* (6) xx, 1897, p. 389.

Teracolus intermissus, *Butler, P. Z. S.* 1883, p. 152, pl. 24, fig. 4 ♂; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 520, 526.

Tecacolus rorus, peelus et dubius, *Swinhoe, P. Z. S.* 1884, p. 438, pl. 39, fig. 8 ♂, p. 439, pl. 39, fig. 9 ♂, & pp. 439, 509; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 520, 521, & 526.

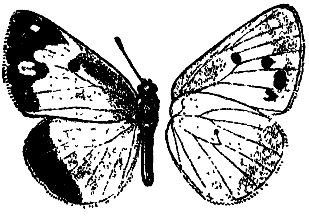

Fig. 69.—*Colotis vestalis.*

Wet-season brood.— ♂. *Upperside*: white; fore and hind wings with broad terminal black bands. Fore wing: base, costal margin broadly and discoidal cell except at its lower apical area heavily irrorated with dusky-grey scales; a short streak at upper apex of cell joined to a large spot on the discocellulars, black; superposed on the black terminal area are two small preapical spots and a much larger subterminal spot in interspace 3, all of the white ground-colour; minute white terminal specks also, often more or less obsolescent, in the interspaces. Hind wing more uniform, very slightly irrorated with grey scales at base, the black terminal band immaculate. *Underside*: greenish yellow sparsely sprinkled with black scales, the yellow very pale on the disc of the fore wing, fading to white along its dorsal margin; discocellular spot and three subterminal posterior spots, that are placed in a curve, black; the lowest spot of the three sometimes extended to the dorsal margin (var. *puellaris*). Hind wing: uniform, with a very small annular spot on the discocellulars. Cilia white. Antennæ, head, thorax and abdomen black, the antennæ speckled and tipped with white, the thorax clothed with long bluish-grey hairs; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: very similar to that of the ♂, the terminal bands broader and brownish rather than black. *Underside*: base and cellular area on fore wing white suffused with greenish yellow; costa and apex of fore and the whole surface of the hind wing pale ochraceous; the fore wing with the black spots as in the ♂, the hind wing in a few specimens with an anterior, discal, somewhat obscure, macular, incomplete band. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.—♂ ♀. Similar to the ♂ ♀ of wet-season brood, but on the upperside the black markings are duller in tint and narrower, while on the underside in both sexes the costal and apical areas on the fore and the whole surface of the hind wing vary from pale ochraceous to dark reddish ochraceous.

Exp. ♂ ♀ 40–50 mm. (1·58–2·00″).

Hab. Within our limits recorded from Baluchistan; the Punjab; Western India; Cutch; Rajputana; Scinde; Central Provinces. Found also in the provinces round the Persian Gulf.

Var. *peelus*, Swinhoe, has the ground-colour on the upperside pale canary-yellow.

652. **Colotis fausta**, *Olivier* (Papilio), *Voy. l'Emp. Oth., Atlas*, 1801, pl. 33, figs. 4 A, 4 B, ♀; *Moore* (Idmais), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 68; *Butler* (Teracolus), *P. Z. S.* 1876, p. 134; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 517, 525; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 498.

Idmais faustina, *Felder, Novara Reise, Lep.* ii, 1865, p. 190; *Butler* (Teracolus), *P. Z. S.* 1876, p. 134; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 517, 525.

Idmais fulvia, *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 392, pl. 9, fig. 5 ♂ ♀; *Butler* (Teracolus), *P. Z. S.* 1876, p. 135; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 518, 525.

Teracolus rosaceus, *Butler, P. Z. S.* 1876, p. 134, pl. 7, fig. 6 ♂; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 518.

Teracolus oriens, *Butler, P. Z. S.* 1876, p. 134, pl. 7, fig. 7 ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 518, 525.

Teracolus solaris, *Butler, P. Z. S.* 1876, p. 135; *Swinhoe, P. Z. S.* 1884, p. 437, pl. 39, fig. 5 ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 518, 525.

Teracolus palliseri, *Butler, A. M. N. H.* (6) i, 1888, p. 418; *Watson Jour. Bomb. N. H. Soc.* viii, 1894, pp. 518, 525.

Race tripuncta.

Idmais tripuncta, *Butler, P. Z. S.* 1868, p. 221, pl. 17, fig. 9 ♂; *Moore, Lep. Ceyl.* i, 1881, p. 130, pl. 49, figs. 3, 3 *a*, ♂ ♀; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 518, 525; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 500.
Idmais surya, *Moore, J. A. S. B.* 1884, p. 45.

♂. *Upperside*: pale salmon-buff, paler in specimens from desert areas, darker in those procured in regions where there is a regular though not heavy rainfall. Fore wing: base and costal margin irrorated in varying degree with dusky scales; an oval annular discocellular spot that varies in size; a black, festooned, postdiscal fascia that extends from costa to vein 4, beyond which the veins are margined with black; this colour broadened subterminally into a second transverse fascia, that is followed by a very fine black line on the extreme terminal margin. In specimens from desert regions the transverse fasciæ and the black edging to the veins are narrow, but in moister areas the two transverse fasciæ unite posteriorly and with the slender black terminal line give an appearance as of a double series of spots of the ground-colour enclosed between them. Hind wing: more uniform, the veins with terminal black spots; costa broadly pale, fading to white. *Underside*: pale yellowish white, in many specimens from moist localities suffused with a beautiful rosy flush; the markings in such specimens prominent, in those from dry localities more or less obsolescent. Fore wing: discocellular spot as on the upperside, but complete, and not an oval ring; in some specimens a postdiscal, dark ochraceous brown, narrow, curved band from costa to middle of interspace 2. Hind wing: a small discocellular spot in the form of an oval light brown ring always much smaller than the similar spot on the fore wing; a postdiscal, curved, more or less sinuate band similar to and in continuation of the band on the fore wing from the costa to vein 1. Antennæ, head, thorax and abdomen dusky black, the club of the antennæ on the underside, the hairs that cover the head and thorax and the scaling of the abdomen salmon-buff; beneath: much paler, fading to white in specimens from dry localities. Sex-mark: a small patch of brown specialized scales on the underside of the fore wing above vein 1, closer to the base than to the termen. On the upperside this is more or less prominent as a small raised spot.

♀. Dimorphic. *Form* 1: ground-colour and markings as in the ♂; the costa of the hind wing on the upperside concolorous with the rest of the wing; the sex-mark of course absent. *Form* 2. *Upperside*: ground-colour white, often more or less irregularly suffused on parts of the wing with salmon-buff; markings similar to those in the ♂, but very much broader. Fore wing: base and costal area heavily irrorated with greyish-blue scales. Hind wing: the terminal spots at apices of the veins large and quadrate, often united into a continuous band which then encloses an anticiliary series of spots of the ground-colour. In a few specimens there are traces of a postdiscal macular black band, in a very few this band is almost complete and very prominent. *Underside*: ground-colour white; markings as in the ♂, but broader, darker and more prominent.

Exp. ♂ ♀ 46–58 mm. (1·82–2·27").

Hab. Within our limits, Baluchistan; Sind; the Punjab; Rajputana and Bombay. Found also in Asia Minor, Arabia, Persia and Afghanistan.

Race **tripuncta**, Butler.—♂ ♀. Very closely resembles the typical from, but this the southern form or race can be distinguished as follows:—♂. *Upperside*: ground-colour a much deeper tint of salmon-buff, almost orange-yellow. Fore wing: costa heavily irrorated with black scales; discocellular spot larger, not annular; postdiscal black fascia at all seasons united to the subterminal fascia and black anticiliary line so that the whole apex and termen of the wing are black, broadly at the costa and gradually narrowed towards the tornal angle. This black area encloses never more than three preapical moderately large spots and a complete series of minute anticiliary specks of the ground-colour. Hind wing: as in *fausta*, but the terminal black spots very large. *Underside*: ground-colour of a richer yellower tint than in the typical form; markings similar, those on the fore wing dusky black, on the hind wing rose-pink. Antennæ, head, thorax, abdomen and sex-mark as in ♂ of the typical form.—♀. *Upperside*: closely resembles the ♀ form 2 of *fausta*, but all the markings are darker and conspicuously broader, while the number of the preapical spots of the ground-colour enclosed within the black area on the fore wing is never more than three, the same as in the ♂. *Underside*, fore wing: white sometimes faintly suffused with yellow; apical and terminal areas anteriorly light to dark ochraceous yellow; discocellular spot very large; transverse, postdiscal, macular dark reddish-brown band very broad. Hind wing: pale ochraceous yellow, sparsely powdered with black scales; transverse postdiscal macular band reddish brown and broad as in the fore wing. Antennæ, head, thorax and abdomen as in ♀ form 2 of *fausta*.

Exp. ♂ ♀ 52–58 mm. (2·05–2·27").

Hab. Western and Southern India: Bombay, Poona, the Nilgiris up to 6000 feet, the Anaimalai Hills; Eastern India: Orissa in Bengal, Ganjam; Ceylon.

653. **Colotis eucharis**, *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 472; *Moore* (Callosume), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 68; *Butler* (Teracolus), *P. Z. S.* 1876, p. 164; *Moore* (Callosume), *Lep. Ceyl.* i, 1881, p. 128, pl. 49, fig. 4 ♂; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 455.

Pieris titea, *Godt. Encycl. Méth.* ix, 1819, p. 124; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

Teracolus pseudevanthe, *Butler, P. Z. S.* 1876, p. 164, pl. 7, fig. 16, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

Teracolus pallens, *Moore, A. M. N. H.* (4) xx, 1877, p. 49; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 523.

♂. *Upperside*: pure white. Fore wing: base and costa for a short distance generally sparsely irrorated with black scales; a broad apical orange-yellow patch, with its inner edge straight and margined with gamboge-yellow; this patch is sometimes immaculate, but generally bears a black diffuse spot on its lower inner edge which may or may not extend to the termen below the orange; costa, apex and termen, the latter nearly up to the tornus, edged and festooned beyond the orange area with black. Hind wing: with black spots at the apices of the veins that vary in size and end on the termen, also a diffuse preapical black spot on the costa. *Underside*: pure white in most specimens, suffused, except on the disc of the fore wing, with pinkish yellow, and at base of the same wing with pure sulphur-yellow; apical orange patch and black terminal markings on the upperside of the fore wing show through by transparency, the former crossed by a sinuous fuscous fascia that ends in a black diffuse spot. Hind wing: shaded with ochraceous at base and with a fuscous preapical spot on costa, also a few scattered transverse fuscous striæ and small spots. Many specimens have the preapical spot continued as an obscure fuscous fascia across the wing and bear a series of large terminal fuscous spots that correspond to the black spots on the upperside. Both fore and hind wings with black discocellular dots. Antennæ, head, thorax and abdomen black; antennæ speckled with white on the sides, head and thorax clothed with short greyish-brown hairs; beneath: the palpi, thorax and abdomen white.—♀. Ground-colour similar; the markings differ from those of the ♂ as follows:—*Upperside*, fore wing: base and costa more heavily irrorated with greyish-black scales; discocellular spot larger; apical area black, with three enclosed elongate orange spots; inner margin of black area irregularly sinuate and diffuse, extended shortly inwards in interspace 3; a transverse black spot across middle of interspace 1. Hind wing: base irrorated more sparsely than in the fore wing with greyish-black scales; preapical spot on costa and terminal spots much larger; in a few specimens there is an obscure transverse posterior discal fascia. *Underside*: markings similar to but very much broader, more heavily marked, and more prominent than those in the ♂; the tranverse fuscous striæ and dots more numerous. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 36–50 mm. (1·42–2·00″).

Hab. Central and Southern India from Jabalpur and Bombay to Travancore; Ceylon.

654. **Colotis etrida**, *Boisduval* (Anthocharis), *Sp. Gén. Lép.* i, 1836, p. 576; *Moore* (Callosume), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 69; *Butler* (Teracolus), *P. Z. S.* 1876, p. 160; *de Nicéville* (Teracolus), *J. A. S. B.* 1890, p. 252; *Davidson & Aitken* (Teracolus), *Jour. Bomb. N. H. Soc.* v, 1890, p. 359; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 456.

Teracolus pernotatus, *Butler, P. Z. S.* 1876, p. 159, pl. 7, fig. 1, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

Teracolus farrinus, *Butler, P. Z. S.* 1876, p. 159, pl. 7, fig. 2, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

Teracolus purus, *Butler, P. Z. S.* 1876, p. 160, pl. 7, figs. 14, 15, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

Teracolus casimirus, *Butler, P. Z. S.* 1876, p. 161, pl. 7, fig. 5 ♂; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, p. 523.

Race limbata.

Teracolus limbatus, *Butler, P. Z. S.* 1876, p. 161; *Moore* (Callosume), *Lep. Ceyl.* i, 1881, p. 129, pl. 49, fig. 5 ♂; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526; *Butler, A. M. N. H.* (6) xx, 1897, p. 456.

♂. *Upperside*: white, sparsely irrorated at base of fore and hind wings with black scales. Fore wing: a small black spot on the discocellulars; apex broadly black, with an enclosed oval, curved, rich orange patch placed obliquely and traversed by the veins, which there are black; inner edge of black area diffuse. Hind wing: uniform, except for a preapical short diffuse black streak from the costa, sometimes absent, and a series of terminal black spots that in specimens from moist localities are very large. *Underside*: white; cell and apex of fore wing suffused with sulphur-yellow, the orange patch of the upperside shows through by transparency, its inner edge margined anteriorly by a very obscure oblique fuscous fascia. Hind wing: the preapical short transverse black streak on the upperside obscurely indicated. ♀. Very similar to the ♂. Can be distinguished as follows:—*Upperside*, fore wing: orange patch enclosed within the black apical area, narrower; a small black spot in middle of interspace 1 and another in interspace 3. Hind wing: the terminal spots slightly larger. *Underside*: apex of fore and whole surface of hind wing suffused lightly, or in specimens from very dry localities heavily, with ochraceous. Fore wing: spots in interspaces 1 and 3 as on the upperside. Hind wing: a curved, almost complete, discal series of fuscous spots; otherwise as in the ♂. In both sexes the antennæ vary from white to pale brownish; head, thorax and abdomen black, the head and thorax with short greyish-brown hairs; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 30–44 mm. (1·20–1·75″).

Hab. Baluchistan; Kashmir; the outer ranges of the Himalayas; throughout peninsular India except Bengal.

Larva. "Much resembles that of a moth caterpillar, being very narrow, the anal segment much prolonged; colour uniform green, with a narrow line along each side just above the roots of the legs, sometimes broader, sometimes yellow, sometimes pinkish-white. It has the curious habit of resting with the anal segment not attached to a twig." (*Davidson MS.*—Extract from de Nicéville's MS. of the Pierinæ, Butt. of Ind.)

Pupa. "Compressed, the snout much prolonged and turned upwards. At first it is greenish, but afterwards becomes a greyish white, beautifully marbled with brown." (*Idem.*)

Race **limbata**, Butler.—This is a barely separable local race that can generally however, be distinguished as follows:—♂ ♀. *Upperside*: black; apical area on fore wing darker, broader, occupying about a third of the wing; the orange patch enclosed within it proportionately narrower, so that the black on its inner margin has the appearance of being broader proportionately than it is in the typical form. Very often this inner edge is bordered by a suffusion of sulphur-yellow, while in some specimens it is extended inwards in interspace 3. Hind wing: the terminal black spots are united and form a continuous band. Coming from a moist region, the underside is very like that of specimens of typical *etrida* procured in similar localities.

Exp. ♂ ♀ 40–48 mm. (1·58–1·90").

Hab. Ceylon.

Many specimens of *etrida* from the Anaimalais and Southern India resemble this race *limbata* very closely.

655. **Colotis danaë** (Pl. XVI, fig. 107), *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 476; *Donovan* (Papilio), *Ins. Ind.* 1800, pl. 26, fig. 2 ♂; *Moore* (Callosume), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 69; *id.* (Callosume) *Lep. Ceyl.* i, 1881, p. 129; *Butler* (Teracolus), *P. Z. S.* 1876, p. 157; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 521, 526; *Butler* (Teracolus), *A. M. N. H.* (6) xx, 1897, p. 498.

Teracolus dulcis, dirus et sanguinalis, *Butler, P. Z. S.* 1876, p. 157, pl. 7, fig. 13, ♂ ♀; p. 157, pl. 7, fig. 11, ♀; & p. 158; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 521, 526.

Callosume sanguinalis, *Moore, Lep. Ceyl.* i, 1881, p. 129.

Teracolus immaculatus, subroseus et taplini, *Swinhoe, P. Z. S.* 1884, p. 443; p. 443, pl. 40, figs. 6, 7, ♂ ♀; & p. 444, pl. 40, figs. 8, 9, ♂ ♀; *Watson, Jour. Bomb. N. H. Soc.* viii, 1894, pp. 521, 526, pp. 521, 526, & 522, 526.

Callosume alberta, *Swinhoe, A. M. N. H.* (6) v, 1890, p. 356; *Watson* (Teracolus), *Jour. Bomb. N. H. Soc.* viii, 1894, pp. 522, 526.

♂ ♀. Coloration very variable, especially in the ♀.—♂. *Upperside*: white, base of wings generally irrorated, but to a varying extent, with black scales. This irroration in many specimens is entirely wanting. Fore wing: with or without a minute black spot on the discocellulars; apex broadly carmine, edged internally and externally with black, this black border varies in width, but both inner and outer borders meet on the costa and on the termen, on the latter they unite and sometimes extend as a black line to the tornus. Hind wing: uniform, except for a series of black terminal spots, which in some specimens are comparatively large and connected together by an anticiliary slender black line, in others minute, more or less obsolescent, unconnected dots. *Underside*: white. Fore wing: base of cell washed with sulphur-yellow; spot on discocellulars as on the upperside; apical carmine area of the upperside represented by an ochraceous-pink patch, not margined with black, but similar in shape and position; in some specimens this is more or less suffused with greyish scales; in all, it is crossed near its inner edge by an obliquely-placed series of four or five spots that vary in colour from pale ferruginous to black. In some specimens there are two terminal diffuse black spots, one each at the ends of veins 2 and 3. Hind wing: the ground-colour generally lightly, often heavily, suffused with ochraceous pink, sometimes pure white; a small spot on the discocellulars pale ferruginous to black, sometimes annular and centred with carmine; followed by a curved macular discal band that also varies in colour from pale ferruginous to black and has the posterior spots often obsolescent, or even completely absent; a series of minute black dots at the apices of the veins that runs to the termen, and may or may not be connected by a slender black anticiliary line. Antennæ pale brown, speckled with white; head, thorax and abdomen black; head and thorax anteriorly clothed with brown, sometimes greyish-black hairs; beneath: palpi, thorax and abdomen white.

♀. *Upperside*: white; base of wings lightly, often heavily, irrorated with greyish-black scales. In some specimens the irroration is very scanty, in others it occupies fully a third of the wings from base and extends as a broad band parallel to the dorsum on the hind wing. Fore wing: an apical carmine patch as in the male but smaller, sometimes reduced to a mere row of preapical pale rosy streaks, but always bordered externally, and generally internally also, by black of varying width. In some specimens the inner black border is very narrow, in others broad, and in a very few entirely absent. The outer border again in some specimens is inwardly festooned, and may be either broad or comparatively narrow. Discocellular spot as in the ♂ but larger, followed by an anterior, postdiscal, macular, curved, black band, the upper spots of which cross the carmine area, or when the carmine area is reduced to short streaks the band crosses the black internal edging to it, showing up in a darker tint than the edging itself; lastly, a black transverse, somewhat diffuse, spot in interspaces 1 and 2. Hind wing: with a dusky spot on the discocellulars, a black, macular, discal, curved, more or less incomplete band, and a terminal row of black spots that in some specimens are connected and form a continuous band. All these markings are generally diffuse. *Underside*, fore wing: white, suffused with sulphur-yellow at base of cell and with ochraceous (in some specimens ochraceous-grey, in others ochraceous-red) on apical area; spot on discocellulars, the postdiscal macular band

and spots in interspaces 1 and 2 as on the upperside, but more clearly defined, the spots that compose the postdiscal band sometimes annular. Hind wing: white, suffused to a greater or less degree with ochraceous, sometimes pink; spot on discocellulars and discal macular band as on the upperside, but both the discocellular spot and the spots that compose the latter more clearly defined, annular and generally centred with carmine; a terminal row of black specks which may or may not be connected by a very slender anticiliary line.

Exp. ♂ ♀ 40–52 mm. (1·57–2·04").

Hab. Within our limits: Baluchistan; Western and Southern India; Ceylon.

Genus **HEBOMOIA.**

Hebomoia, *Hübner, Verz. bek. Schmett.* 1816, p. 95.
Iphias, *Boisduval, Sp. Gén. Lép.* i, 1836, p. 595.

Type, *H. glaucippe*, Linn., from India and China.

Range. Indo-Malayan Region. In India proper confined to the North-eastern and Southern parts.

♂ ♀. Fore wing: triangular; costa arched; apex more or less acute; termen oblique, slightly sinuate; tornus well marked, obtuse; dorsum bisinuate; cell slightly more than half length of wing; upper discocellular minute, oblique, bases of veins 6 and 7 therefore closely approximate, middle and lower discocellulars together concave; vein 8 absent, vein 9 from upper fourth of 7,

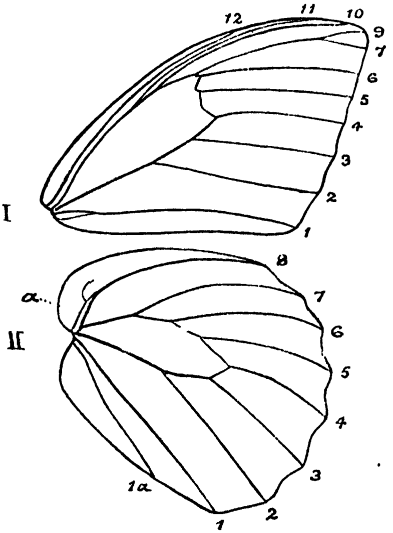

Fig. 70.—*Hebomoia*, venation. *a.* Precostal cell.

10 and 11 free. Hind wing: suboval, broad; apex and tornal angle boldly rounded; precostal nervure simple, short, subobsolete, inclined outwards. Antennæ about half length of fore wing, gradually thickened to apex, latter subtruncate; eyes naked, prominent; palpi situated low down on the face, somewhat flattened, scaly, clothed with stiff hairs anteriorly and at apex, third joint short; thorax and abdomen robust; legs slender; claspers in ♂ elongate.

Key to the forms of Hebomoia.

a. Hind wing: uniform white.	
a′. Upperside fore wing: apical orange patch bordered inwardly with black	*H. glaucippe*, p. 274.
b′. Upperside fore wing: apical orange patch not bordered inwardly with black	*H. glaucippe*, race *australis*, p. 275.
b. Hind wing: not uniform white, terminal half suffused with pure sulphur-yellow	*H. roepstorfi*, p. 276.

656. **Hebomoia glaucippe**, *Linn.* (Papilio) *Syst. Nat.* ed. x, 1758, p. 469; *Hübner*, *Verz. bek. Schmett.* 1816, p. 96; *Butler*, *A. M. N. H.* (7) i, 1898, p. 290.

Race australis (Pl. XVIII, fig. 122).

Hebomoia australis, *Butler*, *A. M. N. H.* (7) i, 1898, p. 290.
Hebomoia glaucippe, *Moore* (*nec Linn.*), *Lep. Ceyl.* i, 1881, p. 127, pl. 49, figs. 1, 1*a*, 1*b*, ♂ ♀, larva & pupa; *Davidson, Bell & Aitken* (*nec Linn.*), *Jour. Bomb. N. H. Soc.* x, 1897, p. 572.

Wet-season brood.—♂. *Upperside*: creamy white. Fore wing: the costa narrowly, the apex and terminal margin to middle of interspace 1, black; an irregular, somewhat sinuous, black band extends obliquely from beyond the middle of the costa across the upper apex of the cell, and meets at interspace 1 the black on the terminal margin; within the triangle thus formed is enclosed a rich orange-red patch that is traversed by the black veins and bears in interspaces 3 to 6 a postdiscal series of black inwardly-elongated spots. Hind wing: nearly uniform, touched with black on the terminal margin anteriorly and with a conspicuous postdiscal black spot in interspace 7; in some specimens one or two smaller spots in continuation of the series in the interspaces below. *Underside*: white; apical third of the fore wing and the whole of the hind wing mottled with more or less prominent brown strigæ and spots; costa of the fore wing and a fine line that runs from base of the hind wing through the cell, straight to the middle of the terminal margin, brown. Antennæ dark brown; head and thorax anteriorly with reddish-brown pile; thorax above greyish blue, abdomen white with a bluish tinge; beneath: head and thorax more or less brownish, abdomen white.—♀. Similar to the ♂. *Upperside*: ground-colour with a slight greenish tinge; the orange patch on fore wing more restricted; it consists of a series of broad streaks in interspaces 3 to 6 and 10, the outer apices of which are deeply incised by black and with a row of hastate orange spots beyond in interspaces 2 to 6. Hind wing: similar to the hind wing in the ♂, but with a postdiscal series of large triangular black spots and a terminal connected series of still larger triangular black spots at the apices of veins 2 to 7. *Underside*: similar to that in the ♂, the brown transverse strigæ and spots more numerous, the costa of the fore and the median line on the hind wing very prominently brown. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.—♂ ♀. Differ only from the ♂ ♀ of the wet-season brood in the slightly more falcate apex to fore wing, and in the purer white ground-colour on the upperside; also the terminal margin of the hind wing in the ♂ has the black markings all but obsolete, while in the ♀ the postdiscal and terminal black markings on the same are smaller than in the wet-season form. *Underside*: the mottlings of brown strigæ and minute spots more numerous and dense.

Exp. ♂ ♀ 94–100 mm. (3·71–4").

Hab. N.E. India; Nepal; Sikhim; Bhutan; Assam; Burma and Tenasserim to the Malay Peninsula, and eastwards through the Shan States of Upper Burma to Siam and China.

Race **australis**, Butler.—♂ ♀. Differs only from the typical form in the following particulars:—Inner black border to the orange patch on the upperside of the fore wing absent, this represented by a few obsolete touches of black scaling. Hind wing: white throughout, with only a half-obliterated subcostal black spot in interspace 7 in the ♂; in the ♀ the postdiscal and terminal series of spots smaller.

Exp. ♂ ♀ as in typical form.

Hab. Southern India from the Ghauts at Khandalla south-eastwards to Ceylon.

The ♂ of this race as noted by de Nicéville (J. A. S. B. lxiv, 1895, p. 505) can scarcely be separated from the ♂ of *H. javanensis*, Wallace, but the ♀ has the orange patch on the upperside of the fore wing as large as in typical *H. glaucippe*, whereas the ♀ of the Javan form has the same much restricted.

Larva. "Subcylindrical, tapering towards each end, numerously covered with minute tubercles; green." (*Moore.*)

Pupa. "Much arched along the back; head pointed." (*Moore.*)

As figured in the 'Lepidoptera of Ceylon':—

Larva. Subcylindrical; suddenly tapered at both ends; covered with transverse rows of pointed tubercles. Colour dark green, with a lateral bluish line bordered inferiorly with a series of minute red spots; legs green, the prothoràcic legs bordered with black that widens on the middle one of the three.

Pupa. Spindle-shaped, head acutely pointed, dorsum much arched. Colour green, a patch of pale ochraceous on the wing-cases and a narrow lateral band of the same colour from head to tail, with a brown line superposed on it that extends to the abdominal segments; abdominal segments and wing-case sparsely spotted with black.

657. **Hebomoia roepstorfi,** *Wood-Mason, J. A. S. B.* xlix, 1880, pp. 134, 150 & 235; *Wood-Mason & de N. loc. cit.* l, 1881, p. 251, pl. 14, figs. 3-5 ♂ ♀.

Extremely like *H. glaucippe*, race *australis*, from which it differs as follows:—♂ ♀. *Upperside*: the white ground-colour partly suffused with bright sulphur-yellow, on the fore wing along the inner margin of the orange patch and over the tornal area, and on the hind wing spread over the outer half of the wing. On the fore wing also the orange patch is more extensive, spreading into the apex of the discoidal cell. In the ♀ the postdiscal series of black spots on the hind wing are smaller than in typical *glaucippe*, and except the posterior one are placed on the inner margin of large diffuse orange-tinted spots, superposed on the sulphur-yellow that suffuses the outer half of the wing. In a few specimens ♂ ♀ the inner black border to the orange patch on the fore wing is present, but is never so broad as in typical *glaucippe*. *Underside*: similar to that in *H. glaucippe*, as are also the antennæ, head, thorax and abdomen.

Exp. ♂ ♀ 86–93 mm. (3·40–3·65″).

Hab. South Andamans; Barren Island.

Genus **PARERONIA.**

Eronia, pt., *Hübner, Samml. Exot. Schmett.* 1816-1836; *Doubleday, Gen. Di. Lep.* 1847, p. 64; *Wallace, Trans. Ent. Soc.* (3) iv, 1867, p. 387.

Valeria, *Horsf. Cat. Lep. Mus. E. I. C.* 1829, p. 139. (Inadmiss., name of species.)

Nepheronia, pt., *Butler, Cist. Ent.* i, 1870, pp. 38, 53.

Pareronia, *de Nicéville, MS.*

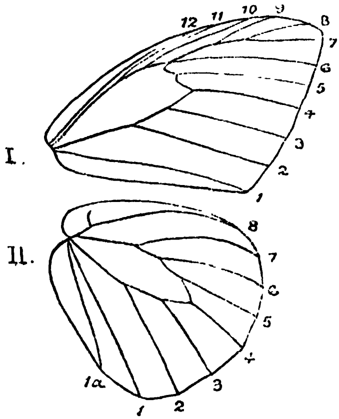

Fig. 71.—*Pareronia*, venation.

Type, *P. valeria*, Cramer, from Java.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa strongly arched; apex blunt; termen slightly sinuate, concave in the middle; tornus rounded; dorsum straight, about three-fourths length of costa; cell about half length of wing; vein 6 from upper apex of cell, upper discocellular therefore absent, middle discocellular strongly bent inwards, almost angulate in the middle, lower very oblique; vein 8 from upper half of 7, 9 from just before middle of 7, 10 and 11 free, from upper third of subcostal. Hind wing subtriangular; cell long, over half length of wing;

discocellulars subequal and very oblique; precostal nervure or spur curved outwards. Antennæ long, considerably longer than half length of fore wing; club gradual, long and slender; palpi very short, third joint particularly so, almost truncate at apex; eyes large, prominent and naked; thorax and abdomen particularly long. The males of the Indian forms, with the exception of *P. avatar*, have a band of specialized dull opaque-looking scales along the terminal black border of the hind wing on the upperside.

Key to the forms of Pareronia.

A. ♂. Upperside: very pale blue; fore wing: veins not, or only very slightly defined with black.—♀ monomorphic; fore wing upperside: the subterminal series of spots in line.......... *P. avatar*, p. 277.

B. ♂. Upperside: darker blue; fore wing: veins distinctly defined or edged with black.—♀. Fore wing upperside: subterminal series of spots not in line, spot in interspace 3 shifted inwards.

  a. ♂. Upperside fore wing: terminal black border narrow, traversed by a more or less complete transverse subterminal series of bluish-white spots.—♀ dimorphic ...... *P. hippia*, p. 278.

  b. ♂. Upperside fore wing: terminal black border broad, not traversed by a transverse subterminal series of spots *.—♀ monomorphic.

    a'. ♂. Upperside hind wing: terminal black border of even width throughout, not narrowed posteriorly .... *P. ceylanica*, p. 281.

    b'. ♂. Upperside hind wing: terminal black border not of even width throughout, distinctly narrowed posteriorly........ *P. pingasa*, p. 280.

658. **Pareronia avatar**, *Moore* (Eronia), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 61, pl. 2 *a*, fig. 1 ♂; *de N.* (Eronia) *J. A. S. B.* 1881, p. 59; *Elwes* (Eronia), *Trans. Ent. Soc.* 1888, p. 419; *de N.* (Nepheronia) *J. A. S. B.* 1882, p. 64.

♂. *Upperside*: very pale blue. Fore wing: costa above the cell, apex very broadly and termen black; this colour occupies the apex above vein 6 (except a narrow short streak of the ground-colour at base of interspace 6) and extends down the termen to the tornus, decreasing in width posteriorly and prolonged a short distance inwards along each vein; median vein lined with black. Hind wing: veins more or less lined with black; a narrow black border to the termen. *Underside*: pale silvery blue, the veins more or less brownish or black and conspicuous, the parts that are black on the upperside a much darker silvery blue. Antennæ, head, thorax and abdomen dusky brownish black; beneath: the palpi, thorax and abdomen very pale blue.—♀. *Upperside*: ground-colour of a paler blue than in the ♂ and much overlaid with dusky black. Fore wing: base broadly and densely irrorated with black scales, two elongate black streaks in cell that do not reach its apex and all the veins broadly bordered with black; this colour coalesces on the outer half of the wing and leaves only broad streaks at bases of interspaces 1 *a* to 6, with beyond them a transverse series of spots of the ground-colour visible. Hind wing: dorsal margin below vein 1 and costa above cell white, all the veins except the upper discocellular more or less broadly lined with black, which colour coalesces outwardly and forms a broad border to the termen; two or three of the streaks of the ground-colour between the veins are succeeded by subterminal spots of the same tint. *Underside*: silvery white, the veins more prominently picked out with black than in the ♂. Antennæ, head, thorax and abdomen as in the ♂ but darker.

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* Occasionally an individual occurs with a minute speck or two of this series present.

Exp. ♂ ♀ 78-90 mm. (3·08-3·54″).

Hab. Sikhim, from 1000 to 5000 ft.; Bhutan; Assam; the Khasia and Naga Hills; the hills of Burma and Tenasserim.

The Tenasserim *avatar* is a smaller and somewhat darker variety, confined, as far as known, to the Dawnat range and other southern ranges of hills in Tenasserim. It is barely separable from typical *avatar*, but all the specimens I have seen have in the ♂ a slightly wider black margin on the upperside of the hind wing, and the ♀ is on the whole slightly darker. The late Mr. de Nicéville separated it in his MS. under the name "*paravatar*."

Exp. ♂ ♀ 67-81 mm. (2·63-3·18″).

Hab. Hills of Middle and Southern Tenasserim.

The type form, *P. valeria*, Cramer, so far as I know, is confined to Java. It has the ground-colour of the wings on the upperside of even a paler blue than in *P. avatar*, almost white, but with broad black terminal margins as in its two Indian representatives, *ceylanica* and *pingasa*, and like them bears no transverse subterminal series of spots on the fore wing.

659. **Pareronia hippia,** *Fabr.* (Papilio) *Mant. Ins.* ii, 1787, p. 55; *Donovan, Ins. Ind.* 1800, pl. 25, fig. 1 ♀; *Elwes* (Eronia), *Trans. Ent. Soc.* 1888, p. 419; *Davidson, Bell & Aitken* (Nepheronia), *Jour. Bomb. N. H. Soc.* x, 1897, p. 573.
Eronia gæa, *Felder, Novara Reise, Lep.* ii, 1865, p. 190; *de N.* (Nepheronia) *J. A. S. B.* 1885, p. 51.

♂. *Upperside*: ground-colour a clear pale blue of a much deeper tint than in *P. avatar*, Moore; all the veins defined with black. Fore wing: costa broadly, apex and terminal margin very broadly black, this black on the termen narrowed towards the tornus, and traversed by a transverse subterminal series of bluish-white spots that are variable in number; the spot in interspace 3 shifted inwards; sometimes the posterior two spots of the series are all but joined on to the streaks of the ground-colour between the veins. Hind wing: dorsal and costal margins broadly whitish; terminal margin broadly black, especially at apex, the black area covered, except at the tornus, with specialized opaque-looking scales. *Underside*: paler blue, the terminal margins of the wings obscurely fuscous, traversed by a subterminal, very indistinct, transverse series of whitish lunulated spots. Fore wing: the veins more or less broadly bordered with black, this edging broadened towards the termen; apex broadly, terminal margin decreasingly to the tornus, suffused with a somewhat obscure pearly-white lustre. Hind wing: the subcostal vein and veins 6, 7, and 8 broadly, the rest of the veins very narrowly edged with black; a very fine black line in interspace 1. Cilia of both fore and hind wings very narrow and white. Antennæ black, head, thorax and abdomen fuscous, the thorax clothed with long bluish hairs; beneath: the palpi, thorax and abdomen pale silvery bluish-white.—♀. *First Form. Upperside*: black; the markings bluish white. Fore wing: cell with two streaks, the anterior one from the extreme base, the posterior one from the end of the basal third, but extending beyond the anterior streak; below and beyond the cell is a series of streaks in the interspaces; the streaks very irregular in length, that in interspace 1 the longest, angulated anteriorly and divided longitudinally from near its base, the streak in interspace 3 short and broad forming an elongate spot, those in the anterior interspaces more or less obliquely placed; beyond these streaks follows a subterminal transverse series of spots, of which the spot in interspace 3 is shifted inwards and those opposite the apex curved backwards. Hind wing: costa and dorsum broadly white; cell and the interspaces beyond with a series of streaks and subterminal spots, more or less as in the fore wing but more regular; the streak in cell and interspace 1 divided longitudinally, the subterminal series of spots evenly curved. *Underside*: similar to the upperside, but the ground-colour dull, dusky and diffuse, the markings broader but less clearly defined; the apical area on the fore wing obscured by a powdering of whitish scales. Antennæ, head, thorax and abdomen much as in the ♂ but darker. *Second Form*. Very like the first, the markings both on the upper and under sides similar, but the ground-colour on the upperside of the hind wing at base of interspace 1 *a*, over the whole of interspace 1, area of cell and at base of interspace 2 suffused with bright yellow. On the underside the same areas are dull ochraceous. The extent of the bright yellow colour on the upperside and of the dull ochraceous tint on the underside is variable, in some specimens more restricted, in others it spreads further towards the costa.

Exp. ♂ ♀ 70–80 mm. (2·76–3·48″).

Hab. Almost throughout Continental India, except the desert-tracts; Assam; Burma; Tenasserim; extending to the Malay Peninsula.

660. **Pareronia pingasa** (Pl. XVIII, fig. 124), *Moore* (Eronia), *P. Z. S.* 1872, p. 565; *Butler* (Nepheronia), *P. Z. S.* 1881, p. 612; *Davidson & Aitken* (Nepheronia), *Jour. Bomb. N. H. Soc.* v, 1890, p. 357; *Ferguson* (Nepheronia), *Jour. Bomb. N. H. Soc.* vi, 1891, p. 445.

Nepheronia compacta, *Butler, Cist. Ent.* i, 1874, p. 235.
Eronia naraka, *Moore, P. Z. S.* 1877, p. 591.
Eronia valeria, *var.* naraka, *Wood-Mason & de N., J. A. S. B.* 1880, p. 237.
Nepheronia fraterna, *Davidson, Bell & Aitken* (*nec Moore*), *Jour. Bomb. N. H. Soc.* x, 1897, p. 573.

Resembles *P. hippia*, Fabr., in colour and in the disposition of the markings, but differs as follows:—♂. *Upperside*: ground-colour a deeper blue. Fore wing: the terminal black border much broader generally, entirely without the transverse subterminal series of bluish-white spots; in a few specimens there are one or two of these spots present, but nothing like the series so conspicuous in *hippia*. Hind wing: the terminal black border very broad, narrowing slightly but distinctly towards the tornal angle. Proportionately this border is even broader than in the fore wing. *Underside*: as in *hippia*.—♀. Closely resembles the ♀ of *P. hippia*, but on the upperside the outer black margins beyond the discal markings on both fore and hind wings are proportionately much broader, the transverse subterminal series of spots that crosses the wing is further from the terminal edge. On the underside the terminal black borders are broader and darker, the subterminal series of spots on apex of the fore and on the hind wing absent or so very thickly overlaid with the dusky brownish-black of the terminal margin as to be very indistinct and blurred. Antennæ, head, thorax and abdomen in both sexes much as in *P. hippia*.

Exp. ♂ ♀ 78–86 mm. (3·10–3·38″).

Hab. Southern India: Kanara, Nilgiris, Mysore, Malabar, Cochin, Travancore; South Andaman Islands.

Larva. "Long, cylindrical or slightly depressed and tapering slightly from the head, which is large, to the tail which ends in two short strong spines clothed with bristles. The body is clothed with very minute hairs. Colour green, with a lateral row of conspicuous white spots from the 5th to the 12th segment and rows of smaller spots on the back. Food-plant, *Capparis heyneana*."

Pupa. "Suspended by the tail and by a very long band...... thoracic portion bent back almost at right angles to the abdominal; head produced into a very long sharp snout; wing-cases forming a keel nearly half an inch in depth, and so thin as to be almost transparent. Colour uniform pale watery green." (*Davidson & Aitken.*)

661. **Pareronia ceylanica,** *Felder* (Eronia), *Novara Reise, Lep.* ii, 1865, p. 191; *Moore* (Nepheronia), *Lep. Ceyl.* i, 1881, p. 138.
Nepheronia fraterna, *Moore, Lep. Ceyl.* i, 1881, p. 139, pl. 54, figs. 3, 3 *a*, ♂ ♀; *Hampson, J. A. S. B.* 1888, p. 363.
Nepheronia spiculifera, *Moore, Lep. Ceyl.* i, 1881, p. 139.

Nearest to and very closely resembles *P. pingasa*, but the hind wing in all the specimens that I have seen is more rounded, thus causing the outer black border on the upperside of that wing in the ♂ to appear more of an even width throughout. On the fore wing the outer black border is not narrowed posteriorly as it is in *P. pingasa*, but is very broad and of even width from vein 5 to tornus, at the latter point it is always distinctly broader than it ever is in *pingasa*.—♂. *Underside*: costa, apical half of fore wing beyond a curved line from costa to tornal angle, and the whole surface of the hind wing nacreous blue with a lustre much richer than that in *P. hippia* or *P. pingasa*. In individuals of the smaller dry-season broods, this nacreous blue lustre extends right up to the termen on both fore and hind wings, through it the black markings of the upperside are obscurely visible by transparency, but there is no black diffuse heavy terminal shading on either wing. In specimens of the wet-season broods which also run distinctly larger, there is a subterminal transverse series of obscure white spots that is bordered both on the inner and outer sides by still more obscure dusky lunular markings.—♀. *Upperside*: markings very similar to those in *P. pingasa* ♀, but the streaks between the veins slightly deeper bluish-white. *Underside*: more or less as in the wet-season form of the ♂; the terminal margins of both fore and hind wings never heavily shaded with dusky black.

Exp. ♂ ♀ 62–76 mm. (2·44–3·00″)[1]

Hab. Ceylon; Southern India: Nilgiri district, Cochin, Travancore.

Family LYCÆNIDÆ.

Egg. "Hard, small, numerous, much wider than high, reticulate, with a whitish, calcareous? accretion forming an asymmetrical network of tetragons." (*Doherty.*)

Larva. In the majority of the genera onisciform, *i. e.*, shaped like woodlice, but with great diversity of the tegumen: "some of them are smooth, many clothed with a short down, some with fascicles of short bristles or regularly disposed tubercles and a few hairy generally; several are corrugated dorsally and others prominently humped in one or two places." (*Trimen.*) The forms in many of the genera are provided with lip-like openings on one of the posterior segments, from which on the application of certain stimuli exudes a sweetish liquid much appreciated by ants of various kinds, that diligently attend such larvæ and protect and guard them against their hymenopterous parasitic enemies, going so far even as to drive and house them inside their nests. The larvæ and pupæ of *Curetis* and *Liphyra*, genera which represent in my arrangement monotypic groups, are altogether abnormal. Full descriptions of these are given under the account of the forms belonging to those genera.

Pupa. Anteriorly rounded and blunt; thorax more or less humped, body posterior to this constricted; abdomen beneath flattened; colour mostly brown or reddish-brown, sometimes green. In many genera there is a covering of erect hairs which in a few becomes remarkably dense and long anteriorly. Generally the pupa is suspended by the cremasteral hooks and secured by a girth, but there are many exceptions to this, and in some genera the larva pupates subterraneously.

Imago. Of small or moderate expanse; shape of wings not so diversified as in the *Papilionidæ*. Fore wing proportionately rather broad and short, the apex and tornus both well-marked, rarely rounded. In the Indian forms vein 8 is absent in all but three genera, and in the females but not the males of three others. Hind wing more variable, but as a rule broadly oval; in many genera narrowed posteriorly or elongate, in others provided with one or more tails, which may be filamentous and comparatively short, or long and then generally of appreciable width. Vein 1 *a* present; dorsal margin broad and more or less channeled to receive the abdomen; precostal spur absent. Body in proportion to the expanse of wing stout and robust. Antennæ not so variable in proportionate length as in the *Nymphalidæ*, in the great majority of the forms stout and not remarkably long. Eyes naked in some genera, in others with a covering of short erect hairs. Legs six in number, all functional, used for walking, but the fore legs in the males "furnished with a long exarticulate tarsus having several hooklets at the tip, distinct from the ungues" (*Westwood*).

On the upperside the wings in this family are, as a rule, brilliantly coloured—rich blues and purples of various shades and brown with blue markings are most common; often these tints have a splendid metallic lustre; while greens and browns which in certain lights take on a metallic bronze or golden sheen are less common. The wings on the underside in a very large proportion of the genera are protectively coloured with dull shades and mottlings of purplish or reddish brown, ochraceous and dingy white, and as the vast majority of the forms in the *Lycænidæ* when at rest sit with their wings closed over their backs, their likeness to the dry and withered leaves and twigs in the undergrowth and bushes which they affect is often startling.

The vast number of forms contained in this family has made its partition, if possible, into groups more comprehensive than genera most desirable. Notwithstanding however, considerable diversity in colouring and in a lesser degree in the shape of the wings and the absence or presence of certain modifications of the termen of the hind wing which take the shape of small rounded projections or lobes or more or less attenuated prolongations, the so-called tails, the venation and structure of the *Lycænidæ* as a whole are very homogeneous, therefore the task of division into natural groups is by no means easy.

Taking the more modern classifications we have the following:—

In 1884 Mr. W. L. Distant, in his magnificent work 'Rhopalocera Malayana,' proposed a division of the established genera into three groups or tribes founded primarily on the presence or absence of a tail or tails to the hind wings. "These 'tails,' however," as pertinently remarked by de Nicéville *, "are sometimes somewhat uncertain characters as genera occur in which obviously very closely related species differ *inter se* in the presence or absence of these delicate filamentous appendages; in fact it would appear that the same species (e. g., *Nacaduba ardates* and *Megisba malaya*) may have both tailed and tailless forms."

In 1886 ('Journal of the Asiatic Society of Bengal,' vol. lv, p. 110) the late Mr. Doherty proposed to divide the *Lycænidæ* into six subfamilies on characters founded on the eggs, their shape and sculpture. To these divisions in a subsequent paper (*loc. cit.* vol. lviii, 1888, pp. 409, 410) he adds a seventh, but at the same time suggested the amalgamation of two of the subfamilies diagnosed in his earlier paper. It is obvious that a classification such as this, however scientifically accurate, is useless for all practical purposes both for workers in the field and in museums. To leave on one side the fact that no museum, so far as I know, possesses a collection of the eggs of butterflies, it is of common occurrence that the females of very many forms from which alone eggs might possibly be procured, are exceedingly scarce, while those of others, and that no inconsiderable number, are absolutely unknown.

Mr. Scudder brought out his 'Butterflies of the Eastern United States and Canada' in 1889, but exhaustive and crammed with information as the work is, it deals with so very limited a fauna that it has not been found possible to successfully adapt the arrangement therein proposed to the much richer fauna represented in British India.

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* 'Butterflies of India,' vol. iii, p. 13.

In the year succeeding the publication of Scudder's work the third volume of the 'Butterflies of India, Burma, and Ceylon,' by L. de Nicéville appeared. I think very few of us who were then in India, glad and thankful as we were for the work, realized what a help it was or were properly grateful for it. In this work de Nicéville has given a most exhaustive key to all the Indian genera of the *Lycænidæ*, but unfortunately he has only indicated by head lines the various groups that in his opinion were formed by certain genera, and gives no account of the characters that separated group from group. The key to the genera is naturally very long and is somewhat difficult to follow, but the groups are, in my opinion, to a large extent natural, and I have, so far as it was possible, adapted them to the arrangement I propose below.

The only important classification that has followed de Nicéville's is that of Schatz and Rober ('Die Familien und Gattungen der Tagfalter,' 1892). In this work the *Lycænidæ* are divided into two subfamilies—the *Theclinæ-Lycænidæ* and the *Lepteninæ*. The former includes the whole of the *Lycænidæ* found in the Indo-Malayan Region, and therefore, so far as the Indian fauna is concerned, no major divisions of the genera in the family are attempted by the learned authors.

After a long and careful examination of the venation and structure in all the Indian genera of the *Lycænidæ*, I believe I have arrived at an arrangement that separates them into seven natural major groups or subfamilies, which are distinguishable one from the other by purely structural characters. This arrangement also accords to some extent with the divisions as proposed by Messrs. Doherty and de Nicéville. The characters can be briefly tabulated as below.

Key to the Subfamilies of the Lycænidæ.

A. Legs abnormal; either tibiæ or tarsi peculiar or elongated .... *Gerydinæ.*
B. Legs normal as described for the family.
  a. Fore wing: veins 5 and 6 approximate at base, or 6 out of 7 beyond apex of cell.
    a'. Fore wing: vein 11 anastomosed with vein 12 .... *Poritiinæ.*
    b'. Fore wing: vein 11 not anastomosed with vein 12 .... *Arhopalinæ.*
  b. Fore wing: veins 5 and 6 not approximate at base.
    a'. Fore wing: vein 7 terminating at or before apex of wing on costal margin.
      a^2. Hind wing: without lobe .... *Lycæninæ.*
      b^2. Hind wing: lobate or sublobate ...... *Theclinæ.*
    b'. Fore wing: vein 7 terminating after apex of wing on terminal margin.
      a^2. Fore wing: vein 8 absent .... *Curetinæ.*
      b^2. Fore wing: vein 8 present .... *Liphyrinæ.*

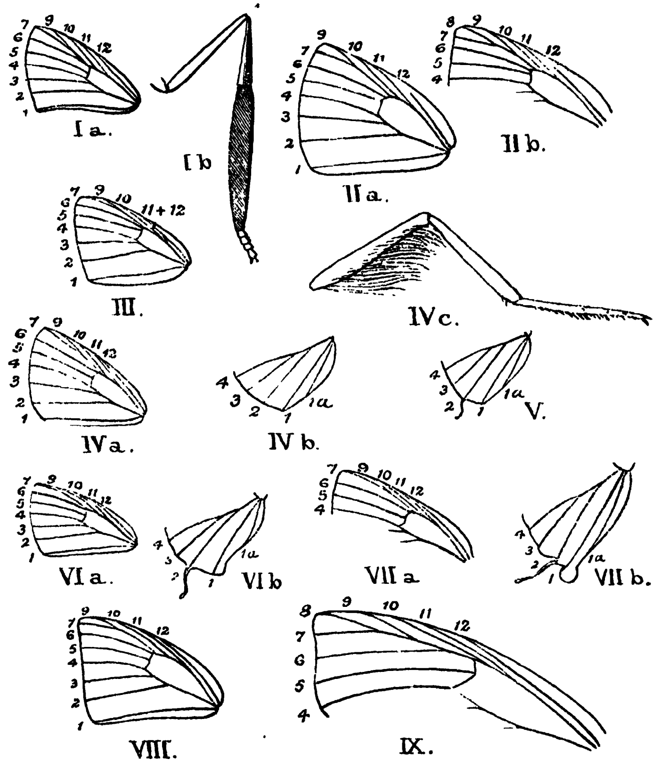

Fig. 72.

I a.	*Gerydus*: fore wing venation	Subfam. *Gerydinæ*.
I b.	,, fore leg	
II a.	*Amblypodia*: fore wing venation, ♀	,, *Arhopalinæ*.
II b.	,, ,, ,, ♂	
III.	*Poritia*: fore wing venation	,, *Poritiinæ*.
IV a.	*Lycæna*: fore wing venation	Subfam. *Lycæninæ*.
IV b.	,, hind ,, ,, (tailless section).	
IV c.	,, fore leg	
V.	*Lampides*: hind wing (tailed section)	
VI a.	*Thecla*: fore wing venation	Subfam. *Theclinæ*.
VI b.	,, hind wing sublobate	
VII a.	*Deudorix*: fore wing venation	
VII b.	,, hind wing lobate	
VIII.	*Curetis*: fore wing venation	Subfam. *Curetinæ*.
IX.	*Liphyra*: fore wing venation	,, *Liphyrinæ*.

For the primary division it will be seen that I have chosen the form of the legs, organs that are functional and in one group, subfamily *Gerydinæ*, are peculiarly modified. For the subdivision of the very large number of the remaining genera, after separating the few that come under the *Gerydinæ*, the venation of the fore wing offers good characters. In all genera of butterflies there seems to be a more or less irregular, sometimes progressive, shifting of the veins of the fore wing upwards towards the costa and outwards towards the apex. In consequence of this movement certain veins become obsolete, and the first of these to disappear are the outer branches of the subcostal, *i.e.* veins 8 and 9. In the Indian genera of the *Lycænidæ*, the great majority of the forms have lost vein 8, in a few more genera vein 9 is also absent, and only (as has already been noted) in three genera are the full number of veins in the fore wing present in both sexes. Attempts to form natural major groups founded on the presence or absence of veins 8 and 9 in the fore wing failed. I turned, therefore, to the specialization and movement of the median system of veins in the same wing and found that though in most, if not all, the non-Gerydine forms, vein 6 had shifted upwards and was emitted close to the base of vein 7 at the upper apex of the discoidal cell, and that even in a few forms it had moved still further outwards and forked from vein 7 beyond the apex of the cell, still in a very large number vein 5 had retained its place and was emitted from the point of junction of the middle and lower discocellulars which were subequal in length; while in a certain number of forms vein 5 had also moved upwards and originated close to the bases of veins 6 and 7. A critical examination of the two non-Gerydine groups thus formed showed that the division was a natural one, all those with veins 5 and 6 of the fore wing approximate can, by other characters and by a facies and style of colouring peculiarly their own, be separated from the members of the group in which vein 5 has retained its original place, and at base is not approximate to vein 6. The minor modifications of the venation in one group, and of the shape of the hind wing in the other, that redivide the two sections just mentioned each into two, have possibly less taxonomical value, but they have the advantage of not separating closely allied forms. In conclusion, I have been obliged to erect monotypic subdivisions for *Curetis* and *Liphyra*. The forms under these genera seem to me curiously isolated, not so much perhaps by the venation of the wings in the imago as by the remarkable abnormalities exhibited in their larval and pupal states.

It is immaterial, I think, in what order the subfamilies are taken, but as a matter of convenience I have adopted, so far as is possible, the sequence and arrangement pursued by de Nicéville.

Subfamily I. GERYDINÆ.

Egg. "Less than one-third high as wide, delicately and somewhat obsolescently reticulate, sometimes carinate, flat above and below." (*Doherty.*)

Larva and *Pupa.* So far as I know no description of these has yet been published.

Imago. Wings elongate, delicate and generally of a dull, sober coloration. Fore wing with eleven veins, vein 9 absent. Hind wing: all the veins present. Termen in both wings sometimes uneven and dentate. Antennæ moderate, about half length of fore wing; club gradual; palpi rather long, with the third joint markedly so and slender. Body slender, abdomen proportionately rather long. Legs remarkably abnormal; the first joint of the tarsi elongate, in one genus flattened also; another genus has the tibiæ incrassate. The genitalia of the ♂ in the *Gerydinæ*, according to Doherty, are peculiar, distinguished by the "long thin plate-like prehensores resembling the valves of the Papilionidæ."

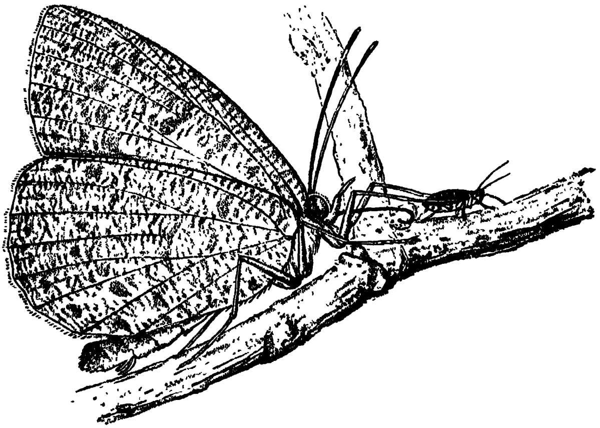

Fig. 73.—*Allotinus horsfieldi*, attending an Aphide.

The habits of the members of this subfamily are alike. The females (at any rate of *Gerydus* and *Allotinus*, which I have closely observed in life) flutter about among low bushes and the undergrowth at the edges of the forest. The males, on the contrary, sit erect on the upperside of the leaves at the extremity of some branch of a tree at no great height above the ground, and from these points of vantage make short, sharp, circling flights, returning to the same or neighbouring leaf and invariably sitting with their heads turned towards the open and not towards the tree. A remarkable habit in one member of this subfamily, viz. *Allotinus horsfieldi* *, has been communicated to me by Colonel H. J. W. Barrow, R.A.M.C. He writes: "I don't know whether you have observed the habits of a small plain butterfly which I caught in Maymyo. I watched it often in the jungle, sometimes for an hour at a time. It puzzled me at first to know why it took such an immense time to settle. It would keep within one yard of a spot and almost settle, twenty times perhaps, before it actually did. Its legs are immensely long, and I discovered why. It settles over a mass of Aphides and then tickles them with its proboscis, just as ants do with their antennæ, and seems to feed on their exudations. I have not made the butterfly big enough nor the ant*, and its legs are not long enough. But it would settle calmly over largish ants and did not mind one or two actually standing up and examining its legs to see who was there. The ants did not attack it in any way."

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* Identified from a drawing kindly sent to me by Colonel Barrow.

So far as I know this is the first recorded instance of butterflies being in attendance on Aphides as ants often are.

The subfamily *Gerydinæ* contains three genera, the differences between which may be tabulated as below.

Key to the Genera of the Gerydinæ.

A. Legs abnormally long; tibiæ of usual form.	
a'. First joint of the tarsi elongate, compressed and flattened	GERYDUS, p. 288.
b'. First joint of the tarsi elongate, but not compressed, cylindrical	ALLOTINUS, p. 296.
B. Legs normal, short; tibiæ outwardly incrassate.	LOGANIA, p. 302.

Genus **GERYDUS**.

Gerydus, *Boisduval, Sp. Gén. Lép.* i, 1836, pl. 23, fig. 2; *Distant, Rhop. Malay.* 1884, p. 205; *de Nicéville, Butt. Ind.* iii, 1890, p. 21.

Miletus, pt., *Westwood* (*nec Hübner*) *in Doubleday, Westwood & Hewitson, Gen. Di. Lep.* ii, 1852, p. 502.

Type, *G. symethus*, Cramer, from the Malay Peninsula.

Range. The Indo-Malayan Region.

♂ ♀. Fore wing: elongate, rather narrow; costa widely arched; apex acute, in ♂ at times slightly produced, in ♀ not produced; termen convex, more so in the ♀ than in the ♂; tornus in ♂ acute, slightly produced, in ♀ not so acute; dorsum bisinuate, long, more than three-fourths the length of costa; cell closed, but the discocellulars very slender and faintly marked; vein 5 at base equidistant from veins 4 and 7; vein 6 from underside of 7 beyond apex of cell, upper discocellular therefore absent; vein 8 absent; vein 9 from middle of 7; vein 10 from subcostal, a little before apex of cell; vein 11 from subcostal, at base closer to apex than to base of cell; vein 12 terminates on costal margin opposite upper apex of cell. Hind wing: elongate, pear-shaped; costa arched near base and apex, more or less straight in middle; termen rounded, curved, in ♀ angulate at apex of vein 4; tornus rounded; dorsum nearly straight; cell short, discocellulars more or less obsolescent; vein 6 from 7 beyond apex of cell; vein 8 long, strongly curved at base, thence bisinuate to termination at apex of wing. Antennæ a little less than half length of fore wing, club slender, very gradual; palpi slender, scaled, not fringed anteriorly, third joint long; eyes naked; thorax and abdomen elongate, ♂ with a subanal tuft of stiff hairs; legs abnormal, compressed, the first joint of the tarsi remarkably long, flattened and broad; claws minute. Some forms of the genus have, in the males, a conspicuous sex-mark, that consists of a slight thickening of the basal portion of vein 4 on the upperside of the fore wing. Of the Indian forms the following have this sex-mark:—*G. symethus*, *G. ancon*, *G. boisduvali*, *G. longeana*, *G. biggsii*, and *G. irroratus*. *G. croton* only is without it.

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* Col. Barrow refers to a sketch he sent me.

Key to the forms of Gerydus.

A. Upperside hind wing: a patch or broad streak beyond apex of cell white or whitish, conspicuously paler than ground-colour of wing .... *G. symethus*, p. 290.
B. Upperside hind wing: ground-colour more uniform, no conspicuous white or pale patch or streak beyond apex of cell.
  a. Upperside fore wing: basal half white, suffused at base with dark or pale brown, with a longitudinal broad brown streak extended into the white area.
    a'. The white area completely divided by the brown streak .... *G. ancon*, p. 291.
    b'. The white area not completely divided by the brown streak .... *G. longeana* ♀, p. 293.
  b. Upperside fore wing: basal half of some shade of brown, not white.
    a'. Upperside fore wing: with a more or less conspicuous discal oblique white fascia.
      a^2. This fascia curved, interrupted and macular posteriorly.
        a^3. Of comparatively large size, expanse over 40 mm. .... *G. croton*, p. 294.
        b^3. Smaller, expanse under 40 mm.
          a^4. ♂ ♀. Upperside fore wing: macular, discal white fascia narrow, lower spots composing it well separated; basal area of wing not conspicuously paler than apical area .... *G. boisduvali*, p. 292.
          b^4. ♂. Upperside fore wing: macular, discal white fascia broad, lower spots composing it not well separated; basal area of wing conspicuously paler than apical area .... *G. longeana* ♂, p. 293.
      b^2. Discal fascia not curved, not macular, straight, broadest in middle ...... *G. biggsii*, p. 295.
    b'. Upperside fore wing: without a discal fascia, only a white spot beyond apex of cell .... *G. irroratus*, p. 295.

662. **Gerydus symethus**, *Cramer* (Papilio), *Pap. Exot.* ii, 1779, pl. 149, figs. B, C, ♀; *Boisduval, Sp. Gén. Lép.* i, 1836, pl. 23, figs. 2 ♀, 2 *a*, 2 *b*, tarsi of fore leg, ♂ ♀; *de N. Butt. of Ind.* iii, 1890, p. 22.

Symetha pandu, *Horsf. Cat. Lep. Mus. E. I. C.* 1828, pl. 2, figs. 2, 2 *a*, ♂ ♀, 2 *b*–2 *i*, structure of imago.

♂. *Upperside*: dusky brownish-black. Fore wing: the ground-colour darker, almost pure black in fresh specimens, on the apical third of the wing; a short streak in the middle of interspace 1, a more outwardly produced similar streak in interspace 2, basal halves of interspaces 3 and 4, the lower apex of the discoidal cell and the extreme base of interspace 5, white, all forming a median conspicuous irregular white patch on the wing, narrowly traversed by the veins which are greyish-brown. Hind wing: more uniform, slightly darker on its anterior half. *Underside*: light brown with an ochraceous tint. Fore wing: the median white patch as on the upperside but larger, its margins less clearly defined, continued posteriorly to the dorsal margin; obscure catenulated, incomplete, transverse, white-margined narrow bands, two at base and two or three very short ones above the white median patch on the costal area; from between the outer two of these latter a transverse, zigzag, very slender, somewhat obscure white line crosses the anterior portion of the wing to vein 4; lastly a pretornal quadrate brown spot near apex of interspace 1 *a* and an obscure subterminal transverse series of slightly lunular small brown spots; the ground-colour terminally paler and more ochraceous than on the inner portions of the wing. Hind wing: crossed by very obscure sinuous brown and white slender lines, that on the costal area form very short, obsolescent, catenulated narrow brown bands; a subterminal series of brown slender lunules, sometimes obsolete. Antennæ, head, thorax and abdomen brown; beneath: paler, the palpi and thorax more or less white.—♀. *Upperside.* Fore wing: dark brown; base shaded with greyish brown; the white median patch as in the ♂, but very much larger, its upper margin irregularly curved; it is spread over the anterior two-thirds of the cell, extends beyond it into the bases of interspaces 4, 5 and 6, and below the cell it occupies the basal four-fifths of interspaces 1 and 2. Hind wing: costal margin broadly dark brownish; wing posteriorly from below the subcostal vein and vein 6 a beautiful pale bluish-grey; a broad whitish streak beyond the cell not reaching the termen. *Underside*, fore wing: the median white patch as on the upperside but larger, extending to the dorsal margin and base of cell; base of wing, costal margin above the subcostal vein and conjoined upper discal obliquely-placed patch greyish brown; apex of wing whitish, termen between veins 1 and 6 broadly stained with rusty; a conspicuous rusty pretornal spot; some obscure white-margined spots at base of cell and along costa, and a transverse subterminal series of black dots. Hind wing: pale ochraceous white, darkening to rusty brown towards the middle of the termen; a subbasal, a median and a discal transverse incomplete macular brown band, each spot in the bands margined on the inner and outer sides by slender black lines; finally a subterminal transverse series of short slender black threads. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 39–46 mm. (1·52–1·80″).

Hab. Within our limits, Tenasserim. Recorded from Moulmein and the extreme south of Mergui. Occurs in Malacca; Sumatra; Java; Amboina; Sula; Flores; New Guinea.

A very variable insect, the tone of the ground-colour on the underside in some very dark, in others lighter and brighter; the form of the markings does not vary, but in some specimens they are very distinctly defined.

663. **Gerydus ancon**, *Doherty, J. A. S. B.* 1889, p. 438, pl. 23, fig. 8; *de N. Butt. Ind.* iii, 1890, p. 23.

♂. *Upperside*, fore wing: basal half or a little more, white, the outer half jet-black; the white area encloses a broad, short, black central streak extended inwards to a dark greyish shading, superposed on the white area at the base of the wing: outwardly the black streak extends slightly along vein 3 and touches the outer black area, the inner margin of which follows an oblique curve from the end of the basal third of the costa to vein 3, thence outwards for a short distance and sinuously downwards to the dorsal margin; on this margin the black area covers about one-fourth of the length from the tornus to the base. Hind wing: greyish brown, darker towards the costal margin; an obscure, broad, white medial streak beyond the apex of the cell not reaching the terminal margin. *Underside*, fore wing: base, costa, apex and terminal margin broadly earthy brown with a slight rusty tinge; remainder of the wing white except a large earthy-brown somewhat diffuse patch below the cell at base of wing and a postdiscal oblique broad black band that extends from below the costa to vein 3; lastly a subterminal transverse line of minute black spots. Hind wing: ground-colour uniformly brown with a rusty tinge; some obscure mottlings of darker brown on the basal area, a few scattered black subcostal spots and a short horizontal macular dark brown band that extends from vein 3 to just short of the dorsal margin. Antennæ, head, thorax and abdomen pale brown; beneath: the palpi, thorax and abdomen ochraceous.—♀. *Upperside*: similar to that of the ♂, but the ground-colour on the hind wing very much darker and uniform; on the fore wing the white area is similar to that in the ♂, but is divided into two portions by a black patch which occupies the whole base of the wing and extends in a broad black band along veins 2 and 3, coalescing with the external black area on the wing. *Underside*: similar to that of the ♂, but on the fore wing the ground-colour on the costa and terminal area darker brown with no rusty tint, but with a few obscure macular mottlings; the patch at base of the wing is dark blackish brown and is extended along the vein and joins the oblique postdiscal short dark brown band. On the hind wing the ground-colour is paler brown without any rusty tint, but darkens posteriorly. Unlike the ♂ the wing is transversely crossed by broken catenulated bands of a darker brown than the ground-colour, these bands here and there margined on the inner side by very slender broken black lines and on the outer side by similar white lines. Antennæ, head, thorax and abdomen as in the ♂, but darker.

Exp. ♂ ♀ 46 mm. (1·8″).

Hab. So far recorded only from Tenasserim.

The above description is drawn up from a single pair in the British Museum. It seems to be a rare form.

664. **Gerydus boisduvali,** *Moore* (Miletus), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 19, pl. 1 *a*, fig. 1 ♀; *Elwes* (Miletus), *Trans. Ent. Soc. Lond.* 1888, p. 374; *de N. Butt. Ind.* iii, 1890, p. 24, pl. 26, fig. 155 ♂.

Miletus chinensis, *Felder, Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 488; *id. Novara Reise, Lep.* ii, 1865, p. 284, pl. 35, figs. 35, 36.

♂. *Upperside*: brown; apical half of fore wing very dark. Fore wing with a short, curved, discal white fascia, sometimes obsolescent and very variable in length. In some specimens it extends from just beyond the cell to vein 3, with or without an elongate white spot in continuation of it in interspace 2 and another in interspace 1; in other individuals it is longer and reaches vein 2, with or without a single elongate white spot in interspace 1. Hind wing: uniform, immaculate. *Underside*: slightly shiny, silken brown, deepening to purplish brown towards the termen and on hind wing. Fore wing: a pale whitish, irregular, somewhat diffuse discal patch; cell crossed by six very slender obscure sinuate white lines, that give the cell the appearance of being crossed by three short brown bands; an irregular postdiscal sinuate transverse series of brown lunules of a shade slightly darker than the ground-colour, those on the anterior portion of the wing are very slender and thread-like, those posteriorly broad and formed into somewhat annular transverse spots, the lower spots cross the discal whitish area; a subterminal series of black dots continued along the apical half of the costa. Hind wing: crossed by more or less obscure, catenulated, dark brown, interrupted bands that are margined on the inner and outer sides by short, thread-like, darker, sinuate lines; a short, maculate, dark purple, transverse band from the middle of the dorsum to vein 4; and a subterminal series of minute black dots that is continued both subcostally and subdorsally to the base of the wing.—♀. Similar to the ♂, but the colour and markings both on the upper and under sides duller. On the upperside of the fore wing the white fascia is generally but not

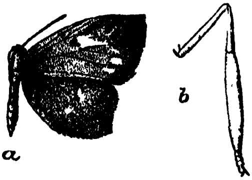

Fig. 74.
a. Gerydus boisduvali.
b. Fore leg.

always broader. On the underside the purplish-brown gloss on the hind wing is restricted to a small area near the middle of the termen, the rest of the ground-colour of the wing is dull brown. The catenulated transverse bands on both fore and hind wings are however, more distinct. Antennæ, head, thorax and abdomen above and beneath in both sexes uniform dark brown.

Exp. ♂ ♀ 34–38 mm. (1·36-1·5").

Hab. Sikhim; Chittagong Hill-tracts; Assam; Upper and Lower Burma; Tenasserim; extending to Java.

665. **Gerydus longeana**, *de Nicéville, Jour. Bomb. N. H. Soc.* xii, 1898, p. 141, pl. Z, figs. 15, 16, ♂ ♀.

♂. *Upperside*, fore wing: area inside of a discal white fascia pale brown; discal fascia variable in breadth, curved, extended from within apex of cell obliquely outwards to the middle of interspace 1, the veins traversing it brownish; rest of the wing uniform dark brown. Hind wing: very pale brown, darker along the costal margin. *Underside*: very pale brown, suffused with ferruginous in the middle of the terminal areas in both fore and hind wings. This rusty tint is very variable in different individuals and in some specimens on opposite wings of the same individual. Markings generally very ill-defined and faint, but the annular transverse broken bands similar to those on the underside of the wings in *G. boisduvali*; medial white patch on fore wing large, extended to the dorsal margin. Antennæ, head, thorax and abdomen pale brown; beneath: the palpi, thorax and abdomen slightly paler.—♀. Some specimens exactly similar in ground-colour and markings to the ♂; others have the basal two-thirds of the fore wing white, shaded with pale brown at the base and with a similarly-coloured longitudinal streak that is broadest in the middle, extended outwards from the base of the wing, but not attaining the dark brown apical area, the tint of which is as in the male. Hind wing: white, shaded with pale brown at base and with darker brown along the costal margin. *Underside*: much as in the ♂ in both the dark and white forms. In the latter the ground-colour on both fore and hind wings is more ochraceous, and the annular markings and bands generally more distinctly defined. Head, thorax and abdomen paler than in the ♂. In the white form of the ♀ they are pale brownish white.

Exp. ♂ ♀ 36–41 mm. (1·43-1·62").

Hab. Upper Burma; recorded so far only from the dry zone.

In Ann. Mag. Nat. Hist. (5) xix, 1887, p. 266, Messrs. Distant and Pryer described *Gerydus petronius* from Northern Borneo, which the present form closely resembles, and with which it is possibly identical. Personally, I am very doubtful whether *G. longeana* is not merely a form of the common *G. boisduvali*, Moore, from a very dry locality. The figures in the Journal of the Bombay Natural History Society seem to me over-coloured. I have seen no specimen with the rich red tinge on the termen of the wings on the underside as shown in the plate.

666. **Gerydus croton,** *Doherty, J. A. S. B.* 1889, p. 439, pl. 23, fig. 9; *de N. Butt. Ind.* iii, 1890, p. 25.

♂. *Upperside*: rich dark brown. Fore wing: a narrow very oblique discal macular streak white, extending from just beyond lower apex of cell to just above the tornal angle, the lower two of the spots that compose it small, widely separated and sometimes obsolescent. Hind wing: immaculate. *Underside*: paler brown, in some specimens darker, in others with a purplish gloss especially on the hind wing. Fore wing: the discal band as on the upperside but broader, more distinctly defined, and varying from white to pale ochraceous; the area below it and up to the base of the wing very dark brown; some obscure annular markings along the costal and on the apical areas. Hind wing: crossed by a basal, subbasal, prediscal, discal and postdiscal annular bands, always obscure and more or less broken and interrupted, the edges of the bands darker than the ground-colour of the wing. Antennæ, head, thorax and abdomen dark brown; beneath: the palpi, thorax and abdomen slightly paler brown.—♀. *Upperside*: similar, the basal half of the fore and the whole surface of the hind wings much paler than the apical half of the fore wing; the dark and light brown shades on this wing divided by an oblique white macular streak as in the ♂, only much broader, with its upper end extended through apex of cell almost to the costa, and the two spots at its lower end larger, always clearly defined. *Underside*: pale ochraceous brown. Fore wing: the white streak on the upperside replaced by a large white medial patch extended to the middle of the dorsum, the outer edge irregularly festooned and its centre occupied by a very dark, broad, fuscous streak, that extends outwards from the base of the wing but does not attain the brown on the apical area; costal and apical areas with the appearance of obscure dark-edged annular markings. Hind wing: crossed by similar annular markings that are always interrupted and broken. Both fore and hind wings with a subterminal line of minute black dots. Antennæ, head, thorax and abdomen coloured like those of the male, but generally paler.

Exp. ♂ ♀ 43–50 mm. (1·70–1·98").

Hab. So far recorded only from Tenasserim and Upper Burma.

I am in doubt whether this is not a large form of *G. boisduvali* from well-fed larvæ that pupate and come to maturity during the rainy season; but in the Jour. Bomb. Nat. Hist. Soc. xii, 1898, at p. 142, the late Mr. de Nicéville stated that the males of *G. boisduvali* had, and the males of *G. croton* had not, the sex-mark peculiar to *Gerydus*. This is so in the few specimens of the males of the two forms that I have had an opportunity of examining, and may serve further to distinguish small males of *croton* from large males of *boisduvali*.

667. **Gerydus biggsii**, *Distant, Rhop. Malay.* 1884, p. 206, pl. 22, fig. 12 ♀; *de N. Butt. Ind.* iii, 1890, p. 24.

♂. *Upperside*: dark brown. Fore wing: base up to a broad obliquely-placed white fascia that crosses the wing paler brown; the fascia extends unbroken from the costa to just above the tornal angle and is broadest in the middle. Hind wing: uniform, immaculate. *Underside*: greyish brown. Fore wing: with a large, medial, anteriorly somewhat rounded, white patch, that extends to the dorsal margin; base, cell and costal margin with some transverse annular markings more clearly defined than in *G. boisduvali*; an anterior, postdiscal, transverse series of slender dark lunules and a subterminal series of black spots. Hind wing: ground-colour with a purplish gloss; basal, subbasal, discal and postdiscal transverse annular curved bands more or less obscure and incomplete, followed by a subterminal series of black dots. Antennæ, head, thorax and abdomen brown; beneath: the palpi, head, thorax and abdomen slightly paler.—♀. Very closely resembles the ♂ both on the upper and under sides, but the oblique discal white fascia on the fore wing above is distinctly narrower, and on the underside the ground-colour is paler than in the ♂; the transverse annular markings on both fore and hind wings much more clearly defined. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 38–41 mm. (1·52–1·62″).

Hab. Lower Burma: Tenasserim; Malay Peninsula; Sumatra.

A very distinct form that does not seem to vary much.

668. **Gerydus irroratus**, *Druce* (Miletus), *P. Z. S.* 1874, p. 106.
Gerydus stygianus, *Butler, A. M. N. H.* (5) xiii, 1884, p. 194.
Gerydus irroratus, *var.* assamensis, *Doherty, J. A. S. B.* 1891, p. 37, pl. 1, fig. 7.

? ♂. *Upperside*: fuliginous brown. Fore wing: a comparatively large, oval, pale or whitish spot surrounding the base of vein 4, but not entering the cell. Hind wing: uniform, immaculate. *Underside*: pale greyish-brown. Fore wing: costa, cell and basal area anteriorly with very obscure, transverse, annular markings; the basal area posteriorly with a dusky diffuse patch, bordered exteriorly by a very ill-defined, pale, brownish-white cloud; a postdiscal, somewhat obscure, very slender lunular white line and some subterminal black dots. Hind wing: with transverse, annular, broad, brown, curved bands showing distinctly on the paler ground-colour; a subterminal transverse series of black dots. Antennæ, head, thorax and abdomen brown; beneath: the palpi, head, thorax and abdomen paler.

Exp. ♂ 41 mm. (1·62″).

Hab. Described originally from Siam. Procured by Mr. Doherty within our limits in Assam: Dhansiri Valley; Nága Hills. Ternate; Amboina.

Notwithstanding that Siam and Ternate and Amboina are such widely-separated localities, I believe *G. stygianus*, Butler, = *G. irroratus*, Druce, = *G. irroratus* var. *assamensis*, Doherty. The type of *stygianus* is in the collection of the British Museum and agrees absolutely both with the too short description of *irroratus* by Druce, and with the figure of var. *assamensis*, Doherty, in the Jour. Asiatic Society of Bengal.

Genus **ALLOTINUS.**

Allotinus, *Felder, Novara Reise, Lep.* ii, 1865, p. 285; *de Nicéville, Butt. Ind.* iii, 1890, p. 27.

Paragerydus, *Distant, Rhop. Malay.* 1884–1886, pp. 207 & 451; *de Nicéville, Butt. Ind.* iii, 1890, p. 25.

Type, *A. unicolor*, Felder, from the Malayan Subregion.

Range. The Indo-Malayan Region.

♂ ♀. Fore wing*: somewhat narrow and elongate; costa widely arched; apex acute in ♂, more rounded in the ♀; termen straight or slightly convex; tornus bluntly angulate; dorsum straight; cell about half length of wing; vein 6 from basal third of 7 beyond apex of cell, upper discocellular therefore absent, middle and lower discocellulars subequal; vein 8 absent, 9 out of 7 not far from apex of wing, 10 from upper apex of cell, 11 from apical half of subcostal. Hind wing*: elongate, oval; costa and dorsum long, very slightly arched; termen regularly curved, minutely dentate; apex and tornus not well-marked. Antennæ long, longer than half length of fore wing, club gradual; palpi erect, slender, third joint long, aciculate; eyes naked; body long and slender, especially in the ♂; legs very long and slender, the first joint of the tarsi remarkably so, but not flattened as it is in *Gerydus*.— ♂ without secondary sex-marks.

Key to the forms of Allotinus.

a. Fore wing: apex acutely and very narrowly produced; termen conspicuously dentate, tornus acutely produced and curved downwards, dorsum bisinuate .... *A. drumila*, p. 297.

b. Fore wing: acute in ♂ but not produced, generally blunt in ♀; termen not dentate or very slightly dentate, tornus bluntly angulate, dorsum straight.

  a'. Fore wing upperside: with a curved more or less ill-defined white discal fascia.......................... *A. multistrigatus*, p. 298.

  b'. Fore wing upperside: with a more or less ill-defined elongate oval spot or broad, short, straight discal streak.

    a². This spot or streak comparatively narrow and small, dull white or brownish white .... *A. horsfieldi*, p. 299.

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* *A. drumila*, Moore, a remarkable and very aberrant form, has the outline of the wings somewhat different.

b^2. This spot or streak very broad, tinged with blue .... *A. subviolaceus*, p. 300.

c^1. Fore wing upperside: uniform brown without a discal streak.

- a^2. Fore wing underside: apex broadly suffused with brown, not concolorous with rest of wing. *Exp.* over 30 mm. .... *A. taras*, p. 300.
- b^2. Fore wing underside: apex not suffused with brown, concolorous with rest of wing.
  - a^3. Fore and hind wings underside ♂ ♀ with a distinct anticiliary comparatively broad brown line. ♀. Hind wing produced at apex of vein 4 into a well-marked triangular tooth. *Exp.* ♂ ♀ 34–38 mm. .... *A. panormis*, p. 301.
  - b^3. Fore and hind wings underside: ♂ ♀ without an anticiliary line. ♀. Hind wing not produced at apex of vein 4. *Exp.* 23–28 mm. *A. nivalis*, p. 301.

669. **Allotinus drumila,** *Moore* (Miletus), *P. Z. S.* 1865, p. 777, pl. 41 fig. 12; *de N. Butt. Ind.* iii, 1890, p. 28.
Miletus insignis, *Staudinger*, *Ex. Schmett.* p. 269, pl. 94, ♀ *non* ♂.

♂ *Upperside*: earthy brown. Fore wing: costa at base and a broad outward discal streak from beyond apex of cell curved downwards towards but not reaching the tornal angle, dull white, diffuse at the edges; apex and termen broadly very dark blackish-brown. Hind wing: costal margin above the subcostal vein and in a line with it up to the termen similarly very dark blackish-brown, the rest of the brown colour uniform without any white. *Underside*, fore wing: dull pale brown, costal margin and disc mottled with small catenulated spots of dark brown; cell with three short transverse bars of dark brown, the middle bar extended below the cell but not reaching the dorsum; a white curved discal band as on the upperside, but obscure, diffuse and ill-defined, merged with a pale area along the middle of the dorsum; termen broadly margined with dark rusty brown that has more or less of a mottled appearance. Hind wing: dull pale brown thickly mottled with catenulated spots and strigæ of dark rusty brown; catenulated, somewhat broken, transverse irregular bands of the latter colour cross the base, middle and apex of the cell; a similar short band is placed at right angles to the dorsal margin and curving slightly upwards terminates at vein 3. Antennæ dark

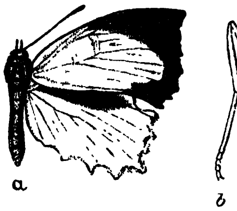

Fig. 75.
a. Allotinus drumila.
b. Fore leg.

brown; head, thorax and abdomen rusty brown; beneath: the palpi, thorax and abdomen narrowly whitish.—♀. *Upperside*: white. Fore wing: apical, terminal and tornal areas black, the inner margin of the black commences just before the middle of the costa, and runs obliquely outward in a sinuous curve to base of the apical fourth of vein 2, thence it is produced for a short distance inwardly along that vein and terminates at the middle of the dorsal margin. Hind wing: a broad black stripe along the costal margin; the termen somewhat narrowly pale yellowish-brown. *Underside*: white, the markings somewhat variable. Fore wing: costa, apex and termen with minute earthy-brown speckles, sparse along the costa, more dense on the termen; on the latter they coalesce and form a brown smudgy border that is bounded on the inner side by a curved, postdiscal, more or less clearly defined, narrow, yellowish-brown band; cell crossed transversely by a basal, a medial and an apical short similar band; the medial band darkened in colour and continued almost to the dorsum, the apical band along the discocellulars. Hind wing: with minute brown speckles, more or less lightly and irregularly stained with rusty brown; basal half with obscure, transverse, narrow, macular, earthy-brown bands that are well-defined only anteriorly, the basal one produced up to the dorsum; a short dark-edged transverse band from the tornus to vein 4 running parallel to the costal margin, the lower edge of the band acutely and irregularly dentate; the terminal and tornal areas below this band washed with earthy brown. Antennæ, head, thorax and abdomen as in the ♂ but very much paler.

Exp. ♂ ♀ 45–52 mm. (1·75–2·20″).

Hab. Sikhim; Bhutan; the hills of Assam.

670. **Allotinus multistrigatus**, *de Nicéville, J. A. S. B.* 1886, p. 253, pl. 11, figs. 11 & 2, ♂ ♀; *Elwes, Trans. Ent. Soc.* 1888, p. 373; *de N. Butt. Ind.* iii, 1890, p. 29, pl. 26, figs. 157, 158, ♂ ♀.

♂. *Upperside*: dark brown. Fore wing: a broad, medial, pale curved patch. Hind wing: immaculate. *Underside*: paler, duller brown; markings on both fore and hind wings a darker brown, nearly all very slenderly encircled or edged with dull white. Fore wing: anterior half very closely, the lower disc more sparsely sprinkled with dark brown spots and specks that vary very much in size; cell with a basal, a medial and an apical short transverse dark brown band; a postdiscal similar but more irregular band made up of detached spots; the dorsal margin broadly paler and nearly free of the dark brown specks and spots; finally a terminal obscure series of dark brown lunules. Hind wing: minute dark brown specks and spots similar to those on the fore wing, three basal detached spots in transverse row; a medial macular dark brown band that crosses the cell and is continued to the dorsum; a large dark brown spot at apex of cell with a similar spot above that touches the costa, and another below it at base of interspace 3; a broad, curved, macular, discal dark brown band, its uppermost spot well-detached, the others confluent; lastly the termen shaded with dark brown. Antennæ, head, thorax and abdomen dark brown; beneath: the palpi, thorax and abdomen paler.—♀ differs from the ♂ as follows:—*Upperside*, fore wing: a conspicuous broad, very oblique medial band that consists of a large, white, somewhat irregularly-shaped spot beyond apex of cell and two spots placed obliquely outwards *en échelon* below it. *Underside*: the dark brown markings on the pale brown ground-colour similar in shape and character but far more clearly defined and prominent, the slender white edgings to the minute spots and specks very conspicuous. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 50–53 mm. (1·98–2·10″).

Hab. The Himalayas from Kumaon to Bhutan at low elevations; the hills of Assam; the Chittagong Hill-tracts.

671. **Allotinus horsfieldi**, *Moore* (Miletus), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 19, pl. 1 *a*, fig. 2 ♂; *Distant* (Paragerydus), *Rhop. Malay.* 1884, p. 207, pl. 20, fig. 7 ♀; *de N.* (Paragerydus) *Butt. Ind.* iii, 1890, p. 26, pl. 26, fig. 156 ♂.

♂. *Upperside*: brown. Fore wing: an elongate oval pale patch beyond apex of cell. Hind wing: uniform, immaculate. *Underside*: dull white. Both fore and hind wings with numerous short, slender, transverse strigæ and minute dots, brown. Fore wing: dorsal area near base below the cell but not further outwards more or less free of spots and strigæ; a narrow brown transverse spot across cell near the base, another across the middle, and a third at the apex of the same: a postdiscal, sinuate, irregular, macular, transverse, broad brownish line followed by a subterminal series of similarly-coloured minute spots. Hind wing: two or three very broken similar transverse broad curved lines, sometimes clearly marked and the detached portions indicating a definite band, in other specimens very irregular and out of line with one another; this is followed by a subterminal series of minute brown dots as on the fore wing. Antennæ, head, thorax and abdomen concolorous with the wings; beneath: the palpi, thorax and abdomen more or less speckled with whitish.—♀. Similar, but in all specimens I have seen invariably smaller. *Upperside*: ground-colour of the same brown shade as in the ♂, the pale postcellular patch on fore wing replaced by a diffuse medial patch that spreads into the cell. Hind wing: as in the ♂. *Underside*: also similar in ground-colour and markings to that of the ♂, but the markings broader, more clearly defined, and less macular. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 28–48 mm. (1·12–1·92″).

Hab. Assam; Burma; Tenasserim; Malay Peninsula; Sumatra; Java; Borneo.

The markings on the underside are extremely variable, no two specimens being alike. Two females from Rangoon have the postdiscal transverse macular markings on the underside very like the same markings in the forms of the genus *Cyaniris*.

672. **Allotinus subviolaceus**, *Felder, Novara Reise, Lep.* ii, 1865 p. 286, pl. 35, figs. 27, 28.
Allotinus alkamah, *Distant, Rhop. Malay.* 1886, p. 452, pl. 44 fig. 3 ♂; *de N. Butt. Ind.* iii, 1890, p. 30.

♂. *Upperside*: brownish black. Fore wing: a medial area from base broadening outwards and extended to a little past the apex of cell, violaceous. This pale area varies very much in width and extent. In typical specimens from Java it is most restricted, but in those from the Malay Peninsula and Tenasserim (*alkamah*, Distant) it occupies a much larger extent of the wing. Hind wing: a broad medial longitudinal violaceous streak not extended to the termen. *Underside*: pale brownish white with darker specks, spots and transverse striæ. These markings on both fore and hind wings tend to coalesce and form broken transverse bands, the detached portions of each band placed more or less *en échelon* one with the other. Antennæ, head, thorax and abdomen pale brown; beneath: the palpi almost white, the thorax and abdomen paler than on the upperside.—♀. *Upperside*: similar to that of the ♂, but the violaceous area on both fore and hind wings of much greater extent. *Underside*: also similar to that of the ♂, but the ground-colour brighter with a tinge of yellow; the markings more ochraceous than brown, more conspicuous and prominent. Antennæ, head, thorax and abdomen as in the ♂ but paler.

Exp. ♂ ♀ 34–40 mm. (1·36–1·56″).

Hab. Within our limits found in Lower Burma and Tenasserim; extending through the Malayan Subregion to Java.

673. **Allotinus taras**, *Doherty, J. A. S. B.* 1889, p. 437, pl. 23, fig. 10 ♂; *de N.* (Paragerydus) *Butt. Ind*, iii, 1890, p. 27.

♂. *Upperside*: similar to that in *A. horsfieldi* but uniform, with no pale elongate patch beyond apex of cell. *Underside*: dull white. Fore wing: the apex and termen anteriorly shaded with brown, the basal two-thirds with transverse brown spots and strigæ, the former varying much in size, some only minute specks; the dorsal margin to some extent nearly free of these brown specks, spots and strigæ. Hind wing: no brown shading, but similar transverse markings of brown specks, spots and strigæ; a very obscure and incomplete, subbasal, very narrow, transverse brown band, followed by a discal zigzag similar band much broken anteriorly. Antennæ, head, thorax and abdomen brown; the palpi, thorax and abdomen speckled with white.—♀. Similar in ground-colour and markings to the ♂, but differs as follows:—a pale diffuse patch on the upperside of the fore wing from base, but not extended above the posterior half of the cell above, or outwards to the terminal margin. *Underside*: the broad immaculate margin to the dorsum of the fore wing broader and whiter than in the ♂, and in all specimens that I have seen both fore and hind wings with a well-defined subterminal series of dark brown spots. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 33–38 mm. (1·29–1·50″).

Hab. Recorded so far only from Tenasserim and the Chittagong Hill-tracts.

674. **Allotinus panormis,** *Elwes* (*Doherty MS.*), *P. Z. S.* 1892, p. 619, pl. 43, figs. 8, 9, ♂ ♀.

♂ ♀. Very close to *A. nivalis*, Druce. ♂. *Upperside*: uniform dark brown; cilia of both fore and hind wings paler brown, shading outwardly into whitish brown. *Underside*: white, with numerous short transverse brown strigæ and minute spots, which are absent, however, along the basal two-thirds of the dorsal margin; terminal margin of both fore and hind wings with a narrow anticiliary brown line. Fore wing: cell with short basal, medial and apical, slightly sinuate, transverse brown bars, beyond which is a complete bisinuate discal series of lunules of the same colour, followed by a subterminal series of white, somewhat triangular, small spots, edged or centred with black. Hind wing: a transverse basal, curved, interrupted series of lunules, a broader lunule at apex of cell, and a discal transverse series of lunules, all similar in colour and shape to those on the fore wing; the subterminal line of white black-centred small spots also as in the fore wing. Antennæ, head, thorax and abdomen dark brown; beneath: the palpi, thorax and abdomen dull white tinged with brownish.—♀. Similar, with similar markings, but, according to the figure on the plate accompanying Mr. Elwes' paper *, with the termen of the hind wing subdentate and acutely triangular, produced at apex of vein 4.

Exp. ♂ 34, "♀ 36" mm. (1·33–1·5″).

Hab. Recorded within our limits from the Karen Hills; Burma; Malay Peninsula; Perak; Dingding Island.

675. **Allotinus nivalis,** *Druce* (Miletus), *P. Z. S.* 1873, p. 348; *Distant* (Paragerydus), *Rhop. Malay.* 1884, p. 207, pl. 22, fig. 11 ♀; *de N. Butt. Ind.* iii, 1890, p. 30, pl. 26, fig. 159 ♀.
Logania substrigosa, *Moore, J. A. S. B.* 1884, p. 22.

♂. *Upperside*: dark brown. Fore and hind wings uniform, immaculate. *Underside*: white. Fore and hind wings with minute specks and short, very slender, transverse striæ, pale brown. In addition, the following similarly-coloured larger spots and transverse markings:—Fore wing: cell crossed by three obscure transverse short narrow bands, the medial band sometimes produced posteriorly, but in no specimen that I have seen extended to the dorsal margin; beyond apex of cell is another pale brown, twice-interrupted, discal similar transverse band, and beyond that a subterminal transverse line of dark spots. Hind wing: a conspicuous dark subcostal spot and some obscure short transverse detached brown bands; a subterminal row of black spots as on the fore wing. Antennæ, head, thorax and abdomen brown, the antennæ darker towards their apices; beneath: the palpi, thorax and abdomen much paler.—♀. *Upperside*: similar to that of the ♂, but in all specimens that I have seen darker, with the apex of the fore wing of a deeper brown tint. *Underside*: also similar to that of the ♂, the markings more ochraceous than brown, the fore wing at apex and along termen more or less faintly suffused with brown.

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* I have not had an opportunity of examining a ♀.

Exp. ♂ ♀ 23–28 mm. (0·90–1·10″).

Hab. Tenasserim: Thaungyin Valley; Dawnat Range: Yè Valley; southwards to Mergui; extending to Malacca and Borneo.

Genus **LOGANIA.**

Logania, *Distant, Rhop. Malay.* 1884, p. 208, woodcut, posterior leg of *L. malayica*; *de N. Butt. Ind.* iii, p. 31.
Malais, *Doherty, J. A. S. B.* 1889, p. 436.

Type, *L. malayica*, Distant, from Malacca.

Range. Burma; Tenasserim; Malacca; Sumatra; Borneo.

♂ ♀. Fore wing: costa arched; apex angulate but not produced; termen just below apex concave, then strongly convex to tornus, acutely but not broadly dentate; tornus more or less obtuse; dorsum straight, about seven-eighths the length of the costa; cell about half length of wing; vein 6 out of 7 from beyond apex of cell, upper discocellular therefore wanting, middle and lower straight, erect; vein 8 absent, vein 9 out of 7 from apical third; veins 10 and 11 free, from apical half of subcostal. Hind wing: elongate pear-shaped; costa long and nearly straight; termen strongly curved and acutely denticulate; dorsum straight, a third shorter than the costa; cell broad at apex, about half length of wing; vein 7 from just before apex of cell; vein 8 long, terminating at apex of wing. Antennæ half length of fore wing, club gradual; palpi hairy, long, third joint very slender; legs: tibiæ incrassate; first joint of tarsi cylindrical, elongate as in *Allotinus*.

Key to the forms of Logania.

♂ ♂.

a. Upperside fore wing: basal bluish-white area extended from costa to dorsum; underside hind wing: with obscure transverse dark brown bands .... *L. marmorata*, p. 303.

b. Upperside fore wing: basal bluish-white area more restricted, not extended quite to costa nor dorsum; underside hind wing:

only mottled with brown, with no trace of transverse bands	*L. watsoniana*, p. 303.
c. Upperside fore wing: without basal bluish-white area; disc with a large dull whitish spot	*L. massalia*, p. 304.

676. **Logania marmorata,** *Moore, J. A. S. B.* 1884, p. 22; *id. Jour. Linn. Soc.* xxi, 1886, p. 39, pl. 3, fig. 7; *de N. Butt. Ind.* iii, 1890, p. 33, frontispiece fig. 128.

♂. *Upperside*: brownish black. Fore wing: basal half violaceous, the outer margin of this colour extending in a curve from the middle of the costal margin to the dorsum, about one-fourth of the length of the latter from the tornal angle. Hind wing: the basal and discal areas paler violaceous, this colour not extended above the middle of the cell anteriorly nor to the dorsal margin posteriorly, towards the termen it stops well short of the margin. *Underside*: white, heavily and somewhat irregularly mottled with dusky black. On the fore wing these mottlings are most dense subterminally, and form an obscure transverse band; on the hind wing they coalesce and form very obscure basal, medial, discal and subterminal bands, the three former distinct only near the costa, the subterminal band in the middle. Antennæ, head, thorax and abdomen pale brownish-white; beneath: the palpi, thorax and abdomen still paler, almost white.

Exp. ♂ 25 mm. (0·98″).

Hab. Recorded so far only from Tenasserim.

The above description is drawn up from a single specimen now in the British Museum, procured by myself in the Haungtharaw Valley in Tenasserim. I have not seen a ♀, and neither Moore nor de Nicéville give the sex of the types, which were procured in Mergui and are now in the Indian Museum.

677. **Logania watsoniana,** *de Nicéville, Jour. Bomb. N. H. Soc.* xii, 1898, p. 143, pl. Z, figs. 17, 18, ♂ ♀.

♂. *Upperside*: white. Fore wing: apex and termen very broadly brownish black, the inner margin of the black area angulated outwards in the middle of interspace 3, the basal third of the wing suffused with very pale greyish-blue, the costal and dorsal margins up to the black area sullied with pale brownish. Hind wing: the costal area from base to termen in a line above the cell brownish black, the white on the posterior half of the wing more or less stained and sullied with brownish. *Underside*: white. Fore wing: costa and apex mottled with brownish, termen broadly brownish black, cell from base with a broad diffuse fuscous patch that extends below the median vein and outwards on to the disc. Hind wing: densely and more or less uniformly mottled with fuscous brownish-black. Antennæ, head, thorax and abdomen fuscous brown above and beneath.—♀. *Upperside*: similar to that of the ♂, but differs as follows :—Fore wing: base outwardly to beyond the cell strongly suffused with bluish grey, only the upper apex of the white area with the ground-colour distinctly showing through; apex and termen more broadly and more densely black. Hind wing: entirely bluish grey, the costal margin broadly irrorated with dusky scales. *Underside*: as in the ♂, but the costa, apex and termen broadly in the fore wing, as well as the whole surface of the hind wing, mottled with brownish; the scaling of this colour forms irregular spots and patches especially on the hind wing, which has a blotched appearance compared with the same wing in the ♂. The basal fuscous cloud extends into the medial white area in the fore wing as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 30-32 mm. (1·20-1·28").

Hab. Recorded so far only from the Northern Shan States, Upper Burma.

678. **Logania massalia,** *Doherty, J. A. S. B.* 1891, p. 37, pl. 1, fig. 8 ♀; *Elwes, P. Z. S.* 1892, p. 620.

♂. *Upperside*: dark brown. Fore wing: a medial dull whitish spot at base of interspace 3 extended upwards on to vein 4 and below into interspace 2. Hind wing: uniform, immaculate. *Underside*: very pale dull brown, with darker brown mottlings and striæ, that on the fore wing are absent on a broad streak from base outwards along the basal half of the dorsum, this area pale brown without markings; a dark obscure spot at apex of cell and an incomplete similarly obscure dark transverse discal band. On the hind wing the mottlings coalesce and form three or four very ill-defined, obscure, transverse, somewhat broad bands. The antennæ in the only specimen of the ♂ that I have seen were wanting; head, thorax and abdomen dark brown. Sex-mark: the base of vein 4 swollen and bare of scales.—♀. "Above black, a round dull white discal area on the fore wing from just above the upper median (vein 4) almost to the submedian vein (vein 1). Below irregularly speckled and variegated; fore wing with the costal and apical parts ochreous brown, the rest blackish. Hind wing also tinged with ochreous, a submarginal dark area, and obscure dark transverse bands. Hind wing not angled, the margin entire." (*Doherty.*)

Exp. ♂ 30 mm. (1·2").

Hab. Assam: Margherita; Shillong.

The type, which is a ♀ and now in Mr. Elwes' collection, is in bad condition. I prefer, therefore, to quote Mr. Doherty's original description. The description of the ♂ is taken from a specimen in my own collection.

Subfamily II. LYCÆNINÆ.

Egg. "Less than half as high as wide, concave above, widest above the middle; reticulations coarse and asymmetrical." (*Doherty.*)

Larva. Of the slug-like shape peculiar to the family *Lycænidæ*; tegumen rough, finely wrinkled, minutely tuberculate, or hairy. Colour generally green, the back marked with darker colours, sometimes pink. The larvæ of several forms are known to be carnivorous.

Pupa. Short and thick, as a rule finely hairy.

Imago. Variable in size, but none very large. This subfamily contains some of the smallest butterflies in the world, the male of *Zizera gaika* is only 15½ mm.; that of *Chilades trochilus* still smaller. Colouring on the upperside generally blue or purple, many very beautifully metallic or shining. A few are dull-coloured, dark or pale brown. Venation of the wings and general structure very similar in all the forms, making it difficult of division into good and easily recognizable genera. The margins of the wings are invariably entire; in no Indian form are they dentate, scolloped, or irregular; the hind wings in a very large number are tailed close to the tornal angle; this appendage is short and filamentous, never in this subfamily either long or of appreciable width; tornal area of the hind wings never lobate, sublobate, or toothed, as in the *Arhopalinæ* and *Theclinæ*, from the former of which it is further distinguished by the difference in venation of the fore wing.

The key to the genera, subjoined below, is more or less artificial, and is intended as a guide only in the difficult work of identification. The sequence of the genera (not in the key but in the succeeding text) is nearly as possible that followed by de Nicéville in the 'Butterflies of India.'

Key to the Genera of the Lycæninæ.

A. Hind wing: without tails.
  a. Fore wing: vein 11 anastomosed with vein 12.
    a'. Hind wing: costa arched.
      a². Underside fore and hind wings: with terminal markings, and on latter wing costal and dorsal markings also, but no discal markings .... PITHECOPS, p. 307.
      b². Underside fore and hind wings: with some discal markings always present.
        a³. Eyes smooth .... ZIZERA, p. 355.
        b³. Eyes hairy .... AZANUS p. 361.
    b'. Hind wing: costa straight or slightly concave .... ORTHOMIELLA, [p. 368.

- *b*. Fore wing: vein 11 not anastomosed with vein 12.
  - *a′*. Fore wing: veins 8 and 9 absent ...... NEOLYCÆNA, p. 353.
  - *b′*. Fore wing: vein 8 absent, vein 9 present.
    - a^2. Upperside: brown with never any blue or purple colouring.
      - a^3. Underside fore and hind wings: with terminal, and on latter wing with costal and dorsal markings also; no discal markings .... NEOPITHECOPS, [p. 309.
      - b^3. Underside fore and hind wings: with discal markings.
        - a^4. Antennæ gradually thickened at apex, no distinct club.
          - a^5. Underside fore and hind wings: with numerous transverse brown strigæ, not spots. Tibiæ of fore legs not remarkably thick .... SPALGIS, p. 310.
          - b^5. Underside fore and hind wings: with numerous rounded dark spots, not strigæ. Tibiæ of fore legs remarkably thick.... TARAKA, p. 312.
        - b^4. Antennæ with a distinct spatulate club .... MEGISBA (tailless form), p. 313.
    - b^2. Upperside: with blue or purple colouring.
      - a^3. Fore wing: veins 6 and 7 well separated at base.
        - a^4. Hind wing: veins 3 and 4 closely approximate at base, emitted from lower apex of cell .... CHILADES, p. 364.
        - b^4. Hind wing: veins 3 and 4 well separated at base, vein 3 emitted from before, 4 from lower apex of cell .... LYCÆNA, p. 334.
      - b^3. Fore wing: veins 6 and 7 closely approximate at base.
        - a^4. Antennæ comparatively short, about half length of fore wing. Underside markings slight and delicate..................... CYANIRIS, p. 315.
        - b^4. Antennæ comparatively long, well over half length of fore wing. Underside markings coarse and large .... NIPHANDA, p. 370.

B. Hind wing: with one or more short filamentous tails close to tornal angle *.

- *a*. Hind wing: with three tails .... LYCÆNESTHES, [p. 372.
- *b*. Hind wing: with one tail.
  - *a′*. Fore wing: veins 11 and 12 anastomosed but fine at base and apex.
    - a^2. Eyes hairy .... NACADUBA, p. 381.
    - b^2. Eyes not hairy.
      - a^3. Fore wing: veins 6 & 7 approximate at base; upperside hind wing: with a large patch of orange posteriorly . TALICADA, p. 375.

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* Except in the genus *Nacaduba*, in which a few tailless forms occur.

b^3. Fore wing: veins 6 and 7 well separated at base; upperside hind wing: either concolorous or with markings of blue or black.
  a^4. Hind wing: vein 3 from before, 4 from lower apex of cell ...... Everes, p. 377.
  b^4. Hind wing: veins 3 and 4 from a point or 4 out of 3 beyond lower apex of cell .... { Castalius, p. 421. / Tarucus*, p. 417.
b'. Fore wing: veins 11 and 12 extended close together, sometimes touching but not anastomosed.
  a^2. Eyes not hairy .... Megisba (tailed form), p. 313.
  b^2. Eyes hairy, or if smooth then veins 11 and 12 of fore wing not touching.
    a^3. Fore wing: veins 6 and 7 closely approximate at base .... Polyommatus, [p. 432.
    b^3. Fore wing: veins 6 and 7 well separated at base.................... Catochrysops, [p. 410.
c'. Fore wing: veins 11 and 12 not anastomosed, but an oblique short bar between them near base .... Lampides, p. 396.

Genus PITHECOPS.

Pithecops, *Horsfield, Cat. Lep. Mus. E. I. C.* 1828, p. 66; *de N. Butt. Ind.* iii, 1890, p. 48.

Type, *P. hylax*, Fabr., from Java.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: elongate; costa strongly arched; apex rounded; termen convex; dorsum straight or very slightly sinuous; cell about half length of wing; upper discocellular † very oblique, almost longitudinal, thickened; middle and lower discocellulars slender, almost vertical, slightly concave, subequal; vein 3 from well before lower apex of cell, vein 4 from lower apex of cell, vein 5 from cell at junction of middle and lower discocellulars; vein 6 from upper apex of cell, its base well separated from base of vein 7; vein 8 absent; vein 9 out of middle of 7, 10 free, 11 anastomosed with vein 12; vein 12 ending on costa very nearly opposite or a little before apex of cell. Hind wing: elongate oval; costa slightly arched, termen very strongly rounded and arched, apex and termen both rounded, dorsum straight. Antennæ slightly longer than half length of fore wing, club comparatively broad and spatulate; eyes naked; palpi subporrect, second joint thickly clothed with adpressed scales, third joint aciculate.

Two forms are known from within our limits.

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* Eyes hairy in one form.

† I take the upper discocellular to be the veinlet between bases of veins 6 and 7. In *Pithecops*, as in a very large number of the genera of the *Lycænidæ*, the general movement of the veins upwards towards the costa has caused this vein to fall into line with the subcostal, and to become to all appearance a portion of that vein.

Key to the forms of Pithecops.

a. Upperside: ground-colour in both sexes brown, with no blue gloss	*P. hylax*, p. 308.
b. Upperside: ground-colour ♂ brown, disc of fore and hind wings shining blue; ground-colour ♀ blackish	*P. fulgens*, p. 308.

679. **Pithecops hylax,** *Fabr. Syst. Ent.* 1775, p. 526; *Horsfield, Cat. Lep. Mus. E. I. C.* 1828, p. 66, pl. 1, figs. 2, 2 *a*, 2 *b*; *de N. Butt. Ind.* iii, 1890, p. 49, pl. 26, fig. 161.

♂ ♀. *Upperside*: brown, in fresh specimens generally uniform, in some slightly paler along a posterior area from base outwards on the fore wing. This is more common in the ♀ than in the ♂. *Underside*: milk-white. Fore wing: a few very obscure specks along the costa, and a postdiscal transverse series of four transversely elongate spots, or short broad lines, pale brown; the spots of the latter arranged two subcostal and two posterior close to the tornal angle; beyond these is a continuous transverse broad brown line that gets paler posteriorly, from costa to dorsum, followed by a subterminal series of similarly-coloured transverse spots, one in each interspace; at the apex these are generally coalescent with the inner brown line; lastly an anticiliary dark brown line. Cilia dark brown. Hind wing: a curved postdiscal series of transverse pale brown spots that terminate at the costa in a prominent large round black spot; a continuous broad pale brown curved line followed by a subterminal dark brown series of spots and an anticiliary line as on the fore wing. Cilia white. Antennæ, head, thorax and abdomen brown; the antennæ spotted with white on the inner side; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 11–13 mm. (0·46–0·53″).

Hab. Sikhim; the hills of Assam, Arracan, Burma and Tenasserim; extending well into the Malayan Subregion.

680. **Pithecops fulgens,** *Doherty, J. A. S. B.* 1889, p. 127, pl. 10, fig. 6; *de N. Butt. Ind.* iii, 1890, p. 50.

♂. *Upperside*: dark brown; medial two-thirds from base to disc of both fore and hind wings glossed with brilliant shining blue. *Underside*: very similar to the underside of *P. hylax*, but on both fore and hind wings the transverse outer postdiscal line is ochraceous rather than pale brown; on the hind wing the inner postdiscal series of transverse spots is wanting and the large round subcostal black spot placed further towards the apex of the wing. Antennæ, head, thorax and abdomen much as in *P. hylax*. —♀. *Upperside*: blackish brown without any suffusion of blue. *Underside*: similar to that of the ♂. Cilia of fore wing pale, of hind wing white.

Exp. ♂ ♀ 11–13 mm. (0·46–0·53″).

Hab. Recorded only from the hills of Assam.

Genus **NEOPITHECOPS.**

Neopithecops, *Distant, Rhop. Malay.* 1884, p. 209; *de N. Butt. Ind.* iii, 1890, p. 51.
Pithecops, *Moore* (*nec Horsfield*), *Lep. Ceyl.* i, 1881, p. 72.
Parapithecops, *Moore, J. A. S. B.* 1884, p. 20.

Type, *N. zalmora*, Butler, from the Malay Peninsula.

Range. India, Assam, Burma, Ceylon, the Andaman Islands, and Malay Peninsula.

♂ ♀. Fore wing: broader proportionately than in the genus *Pithecops*; costa arched but less rounded at apex; termen convex, tornus well-marked, dorsum straight; cell distinctly longer than half the length of the fore wing; venation much as in *Pithecops*, but all the veins wide apart and distinct, vein 11 not anastomosed with vein 12. Hind wing also not so narrow proportionately as in *Pithecops*; cell considerably longer. Antennæ more than half length of fore wing; club well-marked, but long, concave, or excavate on the inner side; eyes naked; palpi as in *Pithecops*, but the third joint stouter, longer proportionately and more blunt at apex.

A single form is known from within our limits.

681. **Neopithecops zalmora,** *Butler* (Pithecops), *Cat. Fabr. Lep. B. M.* 1869, p. 161; *de N. Butt. Ind.* iii, 1890, p. 53.
Pithecops hylax, *Moore* (*nec Fabr.*), *P. Z. S.* 1877, p. 587.
Pithecops dharma, *Moore, Lep. Ceyl.* i, 1881, p. 72, pl. 34, fig. 4 ♂.
Parapithecops gaura, *Moore, J. A. S. B.* 1884, p. 20.
Neopithecops horsfieldi, *Distant, Rhop. Malay.* 1884, p. 210, pl. 22, fig. 15 ♂.

Wet-season brood.—♂ ♀. *Upperside*: dark purplish brown; in the ♀ slightly paler on the disc of the fore wing. In most specimens, but not in all, the ♂ also has the disc of the fore wing similarly paler. *Underside*: white. Fore wing: apex dusky brown, apices of veins 10, 11 and 12 with a minute black dot; no discal markings, but the discocellulars picked out with a short, very slender, obscure brown line; a postdiscal, irregular, transverse series of slender brown lunules, followed by a transverse, very slender, sinuous brown line, the white ground-colour in the interspaces beyond centred by a subterminal series of transverse black spots. Hind wing: discocellulars with a short brown line similar to that on the fore wing, followed by a subdorsal small round black spot, and a subcostal much larger similar spot; between these two spots is a curved, very irregular line of detached pale ashy-brown lunules; the subterminal markings very similar to those on the fore wing. Cilia of fore wing dusky brown, of hind wing white. Antennæ, head, thorax and abdomen dark brown; the antennæ on the inner side speckled with white; beneath: the palpi, thorax and abdomen white.

Dry-season brood.—♂ ♀. Differs from specimens of the wet-season brood as follows:—*Upperside*: ground-colour not so dark generally. Fore wing: a large oval snow-white spot placed obliquely on the disc. Hind wing: apex and disc irregularly white; on the posterior half the ground-colour a shade darker than on the anterior half. *Underside*: ground-colour and markings similar to those of specimens of the wet-season brood, but the markings very much paler and fainter; in specimens taken in the middle of the dry-season in exceptionally dry localities these markings are altogether absent. Antennæ, head, thorax and abdomen on the upperside paler than in the wet-season brood.

Exp. ♂ ♀ 16–28 mm. (0·61–1·12″).

Hab. India: Eastern Himalayas; Bengal: Malda, Calcutta, Orissa; Southern and South-western India, but not recorded from Bombay; Ceylon; Assam; Burma; Tenasserim; the Andamans; extending to the Malay Peninsula.

This form is subject to much seasonal variation. The type in the British Museum is a specimen intermediate between the wet- and the dry-season broods, in which the disc of the fore wing on the upperside is much paler, with a small spot of white in the middle. The *Pithecops dharma* of Moore has the same spot, larger, but no white on the upperside of the hind wing; while *P. gaura*, Moore = the dry-season form.

Genus SPALGIS.

Lucia, pt., *Westwood in Dblday., Westw. & Hewitson's Gen. Di. Lep.* ii, 1852, p. 501.
Spalgis, *Moore, P. Z. S.* 1879, p. 137; *de N. Butt. Ind.* iii, 1890, p. 54.

Type, *S. epius*, Westw., from India.

Range. The Indo-Malayan Region.

♂ ♀. Fore wing: costa slightly arched; apex well-marked, not rounded; termen convex; tornus bluntly angulate; dorsum straight; cell about half length of wing; vein 3 from before lower apex of cell; 5 from junction of middle and lower discocellulars, these latter subequal; veins 6 and 7 closely approximate, from upper apex of cell, upper discocellular therefore absent; vein 8 absent; vein 9 from apex of basal third of 7; 10 and 11 free, from apical third of subcostal. Hind wing: costa somewhat straight; apex, termen and tornus roundly arched; cell about half length of wing; upper discocellular very oblique, middle and lower vertical; veins 3 and 4 from lower apex of cell; 5 from middle of cell: 7 from a little before upper apex of cell. Antennæ about half length of fore wing, club long and gradual; palpi subporrect, third joint short, about one-third the length of the second. Legs short, of the usual Lycænid form.

Key to the forms of Spalgis.

a. ♂ ♀. Upperside: brown; fore wing with a quadrate white spot beyond cell, small in ♂, larger and somewhat diffuse in ♀	*S. epius*, p. 311.
b. ♂ ♀. Upperside: dark brown; fore wing without a quadrate white spot beyond cell in ♂, typically a slight pale patch in ♀	*S. epius*, race ***nubilus***, p. 311.

682. **Spalgis epius**, *Westwood* (Lucia) *in Dblday., Westw. & Hew. Gen. Di. Lep.* ii, 1852, p. 502, pl. 76, fig. 5 ♀; *Moore, P. Z. S.* 1879, p. 137; *id. Lep. Ceyl.* i, 1881, p. 71, pl. 34, figs. 1, 1 *a*, 1 *b*, ♂ ♀, larva & pupa; *de N. Butt. Ind.* iii, 1890, p. 55, pl. 26, fig. 136 ♂.

Race nubilus.

Spalgis nubilus, *Moore, P. Z. S.* 1883, p. 522; *Distant & Pryer, A. M. N. H.* (5) xix, 1887, p. 266; *de N. Butt. Ind.* iii, 1890, p. 56.

♂. *Upperside*: dull brown, slightly darker towards the apex of the fore wing; also a more or less quadrate whitish spot beyond the apex of the cell on the same wing; in some specimens this spot is slightly diffuse. *Underside*: pale, silky, brownish-white; fore and hind wings crossed by numerous, very slender, short, sinuous, transverse, dark brown strigæ which are outwardly slenderly edged with brownish-white of a shade paler than that of the ground-colour; both wings with an anticiliary dark brown line with on the inner side a similar edging. Fore wing, in addition, with an oval white spot beyond the cell. Cilia of both fore and hind wings of the same shade as the ground-colour of the wings. Antennæ, head, thorax and abdomen pale brown, club of antennæ ochraceous at apex; beneath: the palpi and thorax brownish-grey, abdomen pale brown.—♀. *Upperside*: slightly paler brown. Fore wing: the cell and apex darker; a white spot similar to that in the ♂ but larger, beyond the apex of the cell; in most specimens extended diffusely outwards and downwards. Hind wing: similar to that of the ♂. *Underside*: precisely as in the ♂. Antennæ, head, thorax and abdomen paler than in the ♂.

Exp. ♂ ♀ 22–28 mm. (0·86–0·10″).

Hab. Sikhim; Bhutan; Malda; Calcutta; Southern India; Ceylon; Assam; Burma.

Race **nubilus**, Moore.—A very slightly differentiated race distinguishable as follows:—♂ ♀. *Upperside*: ground-colour much darker brown. Fore wing: apex of cell with a black spot, no white spot beyond in ♂, a duller brown slightly diffuse area in ♀, otherwise as in the typical form. *Underside*: ground-colour darker, with a purplish-grey silky lustre; markings as in the typical form. Antennæ, head, thorax and abdomen similar to those of the typical form but darker.

Exp. ♂ ♀ 20–28 mm. (0·79–1·10″).

Hab. Ceylon; the Andamans; Nicobars.

There are two almost typical specimens of this race of *epius* in the British Museum collection labelled Trincomali, Ceylon. The Nicobar specimens that I have seen are all slightly paler both on the upper and under sides, and one or two of the females are barely separable from typical *epius*.

Genus **TARAKA.**

Taraka, *de Nicéville* (*Doherty MS.*), *Butt. Ind.* iii, p. 57.

Type, *T. hamada*, Druce, from Sikhim.

Range. Sikhim eastwards through Assam to China and Japan, southwards through Burma and Tenasserim to Java.

♂ ♀. Fore wing: in shape much as in *Spalgis*, but the termen not so convex; cell proportionately shorter, not quite half length of wing; discocellulars very slender but all present, upper very short, lower the longest, slightly concave; vein 8 absent, vein 9 from middle of 7; 10 and 11 free, from apical half of subcostal; 12 short, ending on costa before apex of cell. Hind wing: costa bluntly subangulate near base, then straight to apex; apex roundly produced; termen convex; tornus rounded; dorsum very slightly arched; cell short, not half length of wing; vein 3 from a little before lower apex of cell; vein 7 from a little before upper apex of cell; vein 8 long, strongly curved upwards at base, then straight nearly to apex of wing. Antennæ slender, not nearly so stout as in *Spalgis*, club very gradual; palpi subporrect, third joint subfusiform, about half the length of the second; eyes naked; body slender; legs proportionately short, very stout; the tibiæ of the fore legs incrassate in the middle, clothed with soft, fluffy, long hair-like scales; tarsi exarticulate in both sexes.

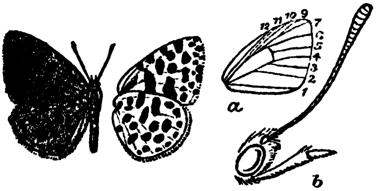

Fig. 76.—*Taraka hamada.*
a. Venation fore wing.
b. Antenna and palpus.

683. **Taraka hamada,** *Druce* (Miletus), *Cist. Ent.* i, 1875, p. 361; *Elwes* (Miletus), *P. Z. S.* 1881, p. 882; *de N.* (Miletus), *J. A. S. B.* 1883, p. 76, pl. 1, fig. 16 ♀; *de N. Butt. Ind.* iii, 1890, p. 58, pl. 26, fig. 164 ♀.

♂ ♀. *Upperside*: uniform very pale brown, somewhat paler in the ♀, the black spots of the underside faintly apparent by transparency. *Underside*: white, with round black spots and markings as follows:—Fore wing: a spot at base of wing followed in transverse order by two spots, again two spots, then an irregular row of five spots that crosses near the apex of cell, the lower two coalescent, beyond that another curved row of five spots, two of which are in interspace 3, then a complete curved series of outwardly-pointed and a terminal series of inwardly-pointed similar spots. The spots of the last series cross a well-marked but very slender anticiliary black line, and thus cause the white cilia to the wing to be alternated with black. Hind wing: similarly crossed by five rows, all of which are more or less curved outwards, of black spots, followed by a slender uninterrupted anticiliary black line. Antennæ, head, thorax and abdomen brown, shafts of the antennæ ringed with white, apex of club ochraceous: beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 20–28 mm. (0·79–1·10″).

Hab. Sikhim; the hills of Assam, Burma and Tenasserim; extending to the Malayan Subregion and to China and Japan.

The description above is taken from Sikhim specimens, but as a rule both Sikhim and Burmese specimens have a very pale brown to a perfectly white patch in the middle of the fore wing, and very often the hind wing also with much white on it. Japanese specimens are much darker and more uniform above.

Genus **MEGISBA.**

Megisba, *Moore, Lep. Ceyl.* i, 1881, p. 71; *de N. Butt. Ind.* iii, 1890, p. 60.
Pathalia, *Moore, J. A. S. B.* 1884, p. 21.

Type, *M. malaya*, Horsfield, from India.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa slightly arched, more so in the ♀ than in the ♂; apex bluntly angulate in the ♂, somewhat rounded in the ♀; termen convex; tornus rounded but well-marked; dorsum slightly sinuous; cell about half length of wing; upper discocellular thickened, longitudinal, with an appearance of forming part of the subcostal vein; vein 7 ending on costa well before apex of wing, vein 8 absent, vein 9 from middle of 7; veins 10 and 11 free, the latter slightly bent upwards towards vein 12 but not touching the latter; vein 12 short, ending on costa well before apex of cell. Hind wing: shape more or less as in *Taraka*; cell proportionately shorter; vein 1*a* very short, not half length of dorsum; veins 3 and 4 approximate, from lower apex of cell; vein 8 as in *Taraka*. Antennæ long, comparatively stout, longer than half length of fore wing; club well-marked, shorter and more abrupt than in either *Spalgis* or *Taraka*; palpi subporrect, third joint subclavate, a little longer than the second joint, longer in the ♀ than in the ♂; eyes naked; body moderately slender; legs normal.

684. **Megisba malaya,** *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1828, p. 70; *Elwes, Trans. Ent. Soc.* 1888, p. 375, pl. 11, fig. 1 ♂; *de N. Butt. Ind.* iii, 1890, p. 61, pl. 26, fig. 165.
Megisba thwaitesi, *Moore, Lep. Ceyl.* i, 1881, p. 71, pl. 34, figs. 3, 3 *a*, 3 *b*, ♂ ♀, larva & pupa.
Megisba sikkima, *Moore, J. A. S. B.* 1884, p. 21.
Pathalia albidisca, *Moore, J. A. S. B.* 1884, p. 21.
Megisba gunga, *Swinhoe, P. Z. S.* 1885, p. 133, pl. 9, fig. 7.

Wet-season brood.—♂ ♀. *Upperside*: from dull somewhat pale brown to dark brown, some specimens nearly uniform, others with a more or less distinct pale discal patch on the fore wing. Hind wing: uniform; a slender short filamentous tail at apex of vein 1, very often absent. *Underside*: white. Fore wing: with the following brown markings:—a spot in cell, a transverse short line on the discocellulars, a postdiscal curved series of transverse spots or very short bars that cross the wing from costa to dorsum and are in irregular échelon one with the other, followed by a slender transverse broken line, a subterminal series of broader transverse spots and an anticiliary slender line; at apex of wing the markings are diffuse and form a very small brown-shaded patch, while further inwards along the costa veins 10, 11 and 12 terminate in a minute brown dot. Hind wing: three spots near base in transverse order, a large, conspicuous, rounded, subcostal and a smaller similar spot near the middle of the dorsum, black; between the latter two and also along the discocellulars are some irregular much paler brown transverse spots on the disc, which are followed as on the fore wing by an outer postdiscal, very slender brown line, a subterminal series of brown or black spots, and a black anticiliary line. Cilia of fore and hind wings white, turning to dark brown at apex of fore wing. Antennæ, head, thorax and abdomen dark brown, the antennæ ringed narrowly with white; beneath: the palpi, thorax and abdomen snow-white, the third, slender acicular joint of the palpi conspicuously brown.

Dry-season brood.—♂ ♀. Very similar to the wet-season brood, but the fore wing on the upperside bears a large, oval, obliquely-placed conical patch that extends from the middle of the dorsal margin to vein 4. In certain specimens * this white bar or patch is continued on to the hind wing. *Underside*: similar to that of the wet-season form but all the markings broader, coarser, more prominent. Fore wing: costa and apex in some specimens broadly shaded with diffuse fuscous brown; the outer postdiscal brown line formed into a series of lunules that extend outwards slenderly along the veins and join the anticiliary brown line, thus enclosing in the interspaces a series of spots of the white ground colour, each of which is centred with a black or dark brown subtriangular spot. Hind wing: the terminal markings modified as on the fore wing; the spot in interspace 3 of the subterminal series larger and more prominent than the others, the large subcostal black spot often broken by an anterior and a posterior silvery spot superposed on it. Antennæ, head, thorax and abdomen as in specimens of the wet-season brood but slightly darker above.

Exp. ♂ ♀ 23-33 mm. (0·9-1·3").

Hab. The Himalayas from Kumaon to Sikhim; Peninsular India: Calcutta, Orissa, Ganjam, Poona, the Nilgiris, Travancore; Ceylon; Assam; Burma; Tenasserim; Andamans; Nicobars; extending far into the Malayan Subregion.

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* *Pathalia albidisca* (= *M. malaya*), Moore, type of Moore's genus *Pathalia*.

Genus CYANIRIS.

Cyaniris, *Dalman, Kongl. Vetensk. Acad. Handl.* xxxvii, 1816, pp. 63, 94; *Moore, Lep. Ceyl.* i, 1881, p. 74: *Distant, Rhop. Malay.* 1884. p. 210; *de N. Butt. Ind.* iii, 1890, p. 92.
Lycænopsis, *Felder, Novara Reise, Lep.* ii, 1865, p. 257.

Type, *C. argiolus*, Linn., from Europe.

Range. Nearctic, Palæarctic, and Indo-Malayan Regions.

♂ ♀. Fore wing: broad and short; costa nearly straight, very slightly and broadly arched; apex blunt; termen slightly convex; tornus more or less rounded; dorsum very slightly sinuate, nearly straight, about five-sixths the length of the costa; cell about half the length of wing; veins 6 and 7 closely approximate at base, upper discocellular therefore very short or absent, middle and lower discocellulars very slender, subequal, slightly oblique; vein 3 from before lower apex of cell, 4 from apex, 6 from upper apex of cell, 8 absent, 9 emitted from basal half of 7, 10 and 11 free, 12 bent towards 11, terminated on costa fully a third before apex of cell. Hind wing: irregularly and broadly oval; costa slightly but distinctly arched; apex and termen in continuation strongly curved; tornus somewhat angular; dorsum slightly arched; cell about half length of wing, middle discocellular shorter than lower; veins 3 and 4 from lower apex of cell. Antennæ not half length of fore wing, club long and spatulate; eyes naked; palpi subporrect, clothed with short adpressed scales, third joint fusiform, bare; body slender. Wings of thinner and more delicate appearance than in the closely allied genus *Lycæna*.

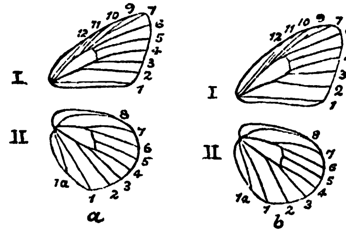

Fig. 77.
a. Venation, genus *Lycæna*.
b. Venation, genus *Cyaniris*.

Key to the forms of Cyaniris.

A. ♂. Upperside: costal margin broadly edged with black, this colour extended into and along anterior half of cell.
  a. Expanse over 35 mm. .... *C. vardhana*, p. 318.
  b. Expanse well under 35 mm.
    a'. ♂ with more or less of white on upperside of fore wing.
      *a*². ♂ ♀. Underside: markings small, delicate, often obsolescent; that in interspace 4 of fore wing vertical, not placed obliquely to rest of postdiscal series .... *C. akasa*, p. 318.
      *b*². ♂ ♀. Underside: markings comparatively large, coarse; never obsolescent; that in interspace 4 of fore wing placed very obliquely to rest of postdiscal series .... *C. marginata*, p. 319.

b′. ♂ without a trace of white on upperside of fore wing .... *C. melæna*, p. 320.

B. ♂. Upperside: costal margin not or only narrowly edged with black; this colour not extended into the cell.

a. Expanse over 40 mm. .... *C. huegeli*, p. 333.

b. Expanse well under 40 mm.

a′. ♂. Upperside fore wing: apical fourth to apical third black.

a^{2}. ♂. Upperside fore wing: with more or less of a discal white patch.

a^{3}. ♂. Upperside fore wing: terminal black edging reduced posteriorly to an anticiliary slender line .... *C. albocærulea*, p. 321.

b^{3}. ♂. Upperside fore wing: terminal black edging distinctly broader posteriorly.

a^{4}. Underside: markings small, delicate and sometimes more or less obsolescent .... *C. transpecta*, p. 322.

b^{4}. Underside: markings large, coarse, very distinct .... } *C. puspa* (dry-season brood), p. 324.

b^{2}. ♂. Upperside fore wing: without any discal white patch. }

a^{3}. Underside: markings small, regularly placed: fore wing: spots in postdiscal transverse series more or less rounded................ *C. chennelli*, p. 327.

b^{3}. Underside: markings large, somewhat irregularly placed; fore wing: spots in postdiscal transverse series elongate.

a^{4}. Upperside: ground-colour purplish blue; underside bluish white..................... } *C. puspa* (wet-season brood), p. 323.

b^{4}. Upperside: ground-colour much paler lilac-blue; underside dull chalky-white .... *C. lilacea*, p. 324.

b′. Upperside fore wing: with less than apical fourth black.

a^{2}. Underside: ground-colour uniform rather dark silky grey, with no trace of white or blue .... *C. victoria*, p. 329.

b^{2}. Underside: ground-colour white or bluish-white.

a^{3}. ♂. Upperside fore wing: with a discal white patch.

a^{4}. ♂. Upperside fore wing: discal white patch small, clearly defined and limited .... *C. albidisca*, p. 325.

b^{4}. ♂. Upperside fore wing: discal white patch large, diffuse.

a^{5}. ♂. Upperside fore wing: terminal black line or narrow band not dilated towards apex .... *C. dilecta*, p. 331.

b^5. ♂. Upperside fore wing; terminal black line or band distinctly dilated towards apex .... *C. jynteana* (dry-season brood), p. 331.

b^3. ♂. Upperside fore wing: without a discal white patch.

a^4. Underside: ground-colour bluish white; base of hind wing with no irroration of bluish scales concolorous with rest of wing.

a^5. ♂. Upperside fore wing: terminal black edging dilated towards apex.

a^6. ♂. Upperside: non-iridescent purplish-blue.

a^7. Underside : markings coarse, irregularly placed; that in interspace 4 of postdiscal series on fore wing very oblique .... *C. placida*, p. 326.

b^7. Underside: markings delicate, regular, *en échelon* with one another.

a^8. Upperside hind wing: with a subterminal series of black spots.. *C. jynteana* (wet-season brood), p. 331.

b^8. Upperside hind wing: without a subterminal series of black spots.. *C. musina*, p. 328.

b^6. ♂. Upperside : brilliant deep iridescent blue .... *C. cyanescens*, p. 326.

b^5. ♂. Upperside fore wing: terminal black edging not dilated towards apex.

a^6. Underside fore wing: postdiscal series of dark spots obliquely placed, distinctly closer to terminal margin of wing posteriorly than anteriorly .... *C. lanka*, p. 330.

b^6. Underside fore wing: postdiscal series of dark spots not obliquely placed as close to terminal margin of wing anteriorly as posteriorly.

a^7. ♂. Upperside: blue with a brilliant silvery iridescence in certain lights.. *C. huegeli*, race *singalensis*, p. 333.

b^7. ♂. Upperside: non-iridescent purplish blue. *C. limbata*, p. 329.

b^4. Underside : ground-colour snow-white with a pearly lustre; a conspicuous irroration of bluish scales at base of hind wing .. *C. cœlestina*, p. 332.

685. **Cyaniris vardhana**, *Moore* (Polyommatus), *P. Z. S.* 1874, p. 572, pl. 66, fig. 5♂; *id. l. c.* 1882, p. 244; *de N. Butt. Ind.* iii, 1890, p. 95.

♂. *Upperside*, fore wing: costa, apex and termen very broadly dusky black; at apex this colour occupies more than a third of the wing in some specimens, and in most is carried narrowly along the dorsal margin to the base; the remainder of the wing pale iridescent blue; the discocellulars marked by a jet-black, very prominent, short, posteriorly acute bar. Hind wing: costal margin broadly shaded with dusky black, the rest of the wing pale iridescent blue, the posterior veins black, very prominent. *Underside*: pearly-white, the bases of the wings slightly glossed with blue. Fore wing: a short broad line on the discocellulars, three upper discal spots placed obliquely beyond it, the anterior two mere minute dots and a postdiscal inwardly oblique series of three larger spots, all dark brown. Hind wing: uniform with a few minute dark brown spots, of which a basal spot in interspace 7 and another further outwards in the same interspace are the most conspicuous. Cilia of both fore and hind wings white. Antennæ, head and thorax dark brown, the antennæ as usual ringed with white; beneath: the palpi, thorax and abdomen white.—♀. Very similar to the ♂, differs as follows:—*Upperside*, fore wing: the disc white, very faintly irrorated with iridescent blue; the discocellular bar broader. Hind wing: the dusky-black edging to the costa broader, the dorsum broadly pale, the blue from base outwards to disc consequently more restricted; a subterminal very ill-defined series of dusky spots followed by the usual anticiliary black line. *Underside*: ground-colour similar to that of the male, the markings similar but larger and more prominent. Antennæ, head and thorax as in the ♂.

Exp. ♂ ♀ 40–42 mm. (1·58–1·66").

Hab. North-West Himalayas: Busahir to Naini Tal.

686. **Cyaniris akasa**, *Horsfield* (Polyommatus), *Cat. Lep. Mus. E. I. C.* 1828, p. 67, pl. 1, figs. 1, 1*a*; *Moore, Lep. Ceyl.* i, 1881, p. 75, pl. 34, fig. 5♂; *de N. Butt. Ind.* iii, 1890, p. 95.

♂. *Upperside*, fore wing: black; a medial triangular area that extends from base outwards to the disc white, suffused at base and anteriorly with iridescent blue that spreads upwards on to the black of the costa; along the dorsum the black ground-colour is much paler, in most specimens diffuse fuscous. Hind wing: white, basal third and costal margin broadly suffused with fuscous, the fuscous at base posteriorly overlaid with iridescent blue; a subterminal series of fuscous-black dots and a distinct but very slender black anticiliary line. *Underside*: white very slightly tinged with bluish; markings all fuscous

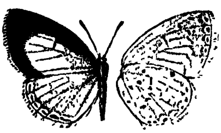

Fig. 78.
Cyaniris akasa.

black, minute and very slender. Fore wing: a short discocellular line followed by an anteriorly, strongly curved, discal series of very short detached lines and a more or less obsolescent transverse series of subterminal dots. Hind wing: three subbasal dots in transverse order; a short line on the discocellulars; a spot below the middle of the costa with a smaller spot below it; a posterior discal irregular sinuous series of five or six minute spots and a perfectly regular subterminal series of similar spots. Cilia of both fore and hind wings white. Antennæ, head, thorax and abdomen blackish, the antennæ ringed with white; beneath: the palpi, thorax and abdomen snow-white.—♀. Very similar. *Upperside*: the white area much more extended on both fore and hind wings. On the former it spreads well into the cell, on the latter three-fourths of the wing are white; the dusky basal and costal areas much more restricted than in the ♂. The iridescent blue suffusion is in many specimens entirely absent, in a few very faintly indicated; the subterminal series of black dots so distinct in the ♂ are generally faint and obsolescent. *Underside*: as in the ♂ but the markings less distinct. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 28–29 mm. (1·10–1·14″).

Hab. Southern India: Nilgiri, Anaimalai and Palni Hills; Ceylon; extending to Java.

687. **Cyaniris marginata,** *de N., J. A. S. B.* 1883, p. 70, pl. 1, fig. 9 ♂; *Moore P. Z. S.* 1883, p. 523, pl. 48, fig. 6 ♂; *Doherty, J. A. S. B.* 1886, p. 134; *de N. Butt. Ind.* iii, 1890, p. 96.

Wet-season brood.—♂. *Upperside*: black. Fore wing: a posterior, medial, somewhat triangular area rich iridescent blue; the outer margin of this area passes from base through the middle of the cell to a little beyond the apex of the latter, then curves sharply round and is continued obliquely to the dorsum at about two-thirds of the distance from base to tornus; outwardly this area is pure white, the discocellulars marked with a slender black tooth. Hind wing: with a similar but more sharply triangular and somewhat dusky blue area limited by the broad black border on the costal margin that occupies fully the anterior third of the wing, is curved sharply round at the apex and forms a somewhat narrower border to the termen; posteriorly the dorsum is still more narrowly dusky black; superposed on the terminal black border is a curved series of small bluish lunules, each lunule outwardly margined by an intense black spot of a shade darker than the black along the termen. *Underside*: white with a faint bluish tint. Fore wing: with the following fuscous-black markings:—a line on the discocellulars, a transverse outer discal series of spots or short bars one in each interspace, the spot in interspace 3 pointing obliquely outwards, that in interspace 4 still more oblique, forms an angle with the one above it, lastly the spot in interspace 6 shifted well inwards; a postdiscal slightly curved line of transverse lunules, succeeded by a subterminal series of spots and a very slender anticiliary line. Hind wing: a black spot close to base on the dorsal margin succeeded by a transverse series of three conspicuous black spots, with a still more conspicuous rounded similar spot further outwards about the middle of the costa; a line on the discocellulars, some irregularly placed spots on the disc and postdiscal, subterminal and anticiliary markings as on the fore wing. Cilia of both fore and hind wings bluish white. Antennæ black, the shafts ringed with white, club tipped with ochraceous; head, thorax and abdomen black; beneath: the palpi, thorax and abdomen white.— ♀. *Upperside*: brownish black. Fore and hind wings: the iridescent blue areas as in the ♂ but very much more restricted; on the hind wing the subterminal curved series of bluish lunules barely indicated by similar markings of a shade paler than the ground-colour; the deep black spots that margin the lunules on the outer side can only be seen in certain lights. *Underside*: as in the ♂ but the markings broader and coarser, all of a rich brown, not fuscous-black or deep black colour.

Dry-season brood.— ♂ ♀. Closely resemble the ♂ ♀ of the wet-season brood, but on the upperside the pale areas on both fore and hind wings are of greater extent with more of white and less of the iridescent blue; this bluish-white area is especially extended on the hind wing, encroaching upwards on the dark ground-colour. In some specimens of the males the black on the terminal margin on the hind wing is barely indicated near the apex, but there is a conspicuous subterminal series of black spots and a slender anticiliary black line. *Underside*: ground-colour and markings similar to those in the wet-season form, but as a rule very slender and trending to obsolescence. In some specimens the markings are often very irregular, some (generally the discal) markings on the fore wing are slender and prominent, while those on the hind wing are slender and subobsolescent. Antennæ, head, thorax and abdomen as in the wet-season form.

Exp. ♂ ♀ 30–35 mm. (1·18–1·36″).

Hab. Himalayas: Kumaon to Sikhim at from 4000 to 10,000 feet; the hills of Upper Burma.

688. **Cyaniris melæna**, *Doherty, J. A. S. B.* 1889, p. 434, pl. 23, fig. 13; *de N. Butt. Ind.* iii, 1890, p. 97.

♂. *Upperside*: deep brown. Fore wing: with the basal half dark blue, dull in certain lights, rich, shining and iridescent in others; this colour does not reach the costa, apex or termen where the ground-colour forms a broad border to the blue. Hind wing: uniform brown; in certain lights iridescent blue over the basal third, but the blue does not reach either the costa or the dorsum. *Underside*; dull greyish-white. Fore wing: with the following fuscous-brown markings:—a short transverse line on the discocellulars; a postdiscal transverse series of elongate spots or extremely short bars, the posterior three placed slightly *en échelon*, the one nearest the costa shifted well inwards; beyond this a transverse unbroken line, a subterminal series of small spots and an anticiliary dark line; costal margin somewhat broadly shaded with very pale brownish-grey. Hind wing: a minute spot on dorsum near base of wing, a series of three subbasal spots placed obliquely across the wing and beyond them a much larger round subcostal spot in interspace 7, black; a short dusky brown line on the discocellulars, a brown spot above it in base of interspace 6; a transverse posterior discal series of five spots also brown, the upper four in a slight curve, the lowest shifted outwards out of line with the others; lastly, terminal transverse markings much as on the fore wing, only the fuscous brown line on the inner side of the subterminal series of spots replaced by a series of connected slender lunules. Cilia of fore and hind wings grey. Antennæ, head, thorax and abdomen dark brown, the antennæ ringed with white; beneath: palpi, thorax and abdomen greyish white.

♀ unknown.

Exp. ♂ 32 mm. (1·26″).

Hab. Within our limits recorded from Southern Tenasserim; extending into the Malay Peninsula.

689. **Cyaniris albocærulea** (Pl. XIX, fig. 125), *Moore* (Polyommatus), *P. Z. S.* 1879, p. 139; *de N., J. A. S. B.* 1883, p. 71, pl. 1, figs. 4, 4 *a*, ♂ ♀; *id. Butt. Ind.* iii, 1890, p. 98.

♂. *Upperside*, fore wing: blackish brown, a central patch that occupies the lower apical portion of the cell and the basal halves of interspaces 2 and 3 white; lightly suffused with iridescent lilacine blue; this colour is intensified and spreads upwards over the dark brown along the basal portion of the costa, inwards right up to the base of the wing, downwards over three-fourths of the dorsal area from base and outwards from the white patch towards the termen; the ground-colour occupies the apex very broadly, and posteriorly forms a broad border to the termen. Hind wing: lilacine blue, base and costal margin broadly suffused with fuscous; a large subapical patch diffusely white; finally, an anticiliary line black. Cilia of both fore and hind wings white, turning to brown towards the apex of the fore wing. *Underside*: white, the terminal markings generally prominent in other forms, more or less obsolescent in both fore and hind wings in all specimens that I have seen. Fore wing: the slender short line on the discocellulars and the discal transverse series of short detached lines pale brown, the latter sinuous and anteriorly curved inwards. Hind wing: three subbasal spots in transverse order, a spot below the middle of the costa not larger or more prominent than the others, and an irregular discal series of elongate spots, pale brown. Antennæ, head, thorax and abdomen dark brown, the antennæ ringed with white; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*, fore wing: a beautiful lilacine blue with a white central patch that occupies the lower apical half of the cell and the basal three-fourths of interspaces 3, 4 and 5; apex of wing and upper portion of termen broadly black, the inner border of this colour curving from a preapical point on the costa to apex of vein 3, thence the black continued as a slender anticiliary line to the tornus. Hind wing: white shaded with pale lilacine blue at base and broadly along the costal and dorsal margins; a slender anticiliary black line. Cilia as in the ♂. *Underside*: similar to that of the ♂, all the markings slighter, more delicate, and on the hind wing more irregular. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 33–35 mm. (1·30–1·38″).

Hab. Himalayas: from Simla to Sikhim, from 2000 to 8000 feet.

690. **Cyaniris transpecta** (Pl. XIX, fig. 126), *Moore* (Polyommatus), *P. Z. S.* 1879, p. 139; *de N.*, *J. A. S. B.* 1883, p. 70, pl. 1, figs. 6, 6 *a*, ♂ ♀: *id. Butt. Ind.* iii, 1890, p. 99, pl. 26, figs. 170, 171, ♂ ♀.

Cyaniris latimargo, *Moore*, *P. Z. S.* 1883, p. 523, pl. 48, fig. 9, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 100.

♂. *Upperside*: white. Fore wing: costa narrowly, apex broadly and terminal border black, the inner margin of this colour curved opposite the apex but extended straight down the termen to the dorsal margin, the black border on the termen of even width below vein 4; the rest of the wing, except a very broad discal anteriorly-rounded area, shaded with lilacine blue. Hind wing: shaded with lilacine blue that fades to diffuse white on an anterior discal area corresponding to the white discal area on the fore wing; a subterminal series of transverse small spots and a slender anticiliary line black. In some specimens (var. *latimargo*) there is a broad black band on the termen which coalesces with and spreads inwards beyond the line of subterminal black spots. *Underside*: white with a faint bluish tint; markings slender and delicate. Fore wing: a slender short brown line on the discocellulars; a postdiscal, very regular, transverse series of abbreviated, slender, short pale brown lines all *en échelon* with one another, followed by an obscure similarly-coloured lunular line and subterminal series of spots. Hind wing: the three transversely-placed subbasal spots and the subcostal spot in interspace 7 black, the rest of the markings pale brown, the discal series of spots more regular than in most of the forms; the terminal markings as on the fore wing. In var. *latimargo* the markings are much coarser and the terminal series on both fore and hind wings more clearly defined. Antennæ, head, thorax and abdomen black, the antennæ annulated with white; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: similar to that of the ♂ but the white area of much less extent on the fore wing, of greater extent on the hind wing, the suffusion of lilacine blue absent on both fore and hind wings; the terminal markings on the hind wing broader and more clearly defined. *Underside*:

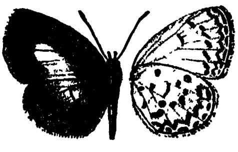
Fig. 79.
Cyaniris transpecta, ♀.

ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen dark brown, not black, but otherwise as in the ♂.

Exp. ♂ ♀ 26–34 mm. (1·04–1·34").

Hab. Sikhim; Assam; Burma; Tenasserim; the Nicobars.

A variable insect; some specimens, probably of wet-season broods, have much less white on the upperside on both fore and hind wings, while the terminal borderings are broad and black, the markings on the underside coarser, more regular and more clearly defined.

691. **Cyaniris puspa** (Pl. XIX, fig. 127), *Horsfield* (Polyommatus), *Cat. Lep. E. I. C.* 1828, p. 67; *Moore, P. Z. S.* 1882, p. 245; *de N., J. A. S. B.* 1883, p. 67, pl. 1, fig. 5*a*, ♀; *id. Butt. Ind.* iii, 1890, p. 100.

Polyommatus lavendularis, *Moore, A. M. N. H.* (4) xx, 1877, p. 341; *id.* (Cyaniris) *Lep. Ceyl.* i, 1881, p. 75, pl. 34, figs. 6, 6 *a*, 7, ♂ ♀.

Wet-season brood.—♂. *Upperside*: violaceous blue, with brilliant iridescent tints in certain lights. Fore wing: the costa, apex and termen bordered with black, this edging narrows from base to the middle of the costa, then broadens greatly at apex, where it occupies the apical fourth of the wing, and is again narrowed below vein 4, whence it is continued as an even band to the tornus; on the disc beyond the apex of the cell the ground-colour is sensibly paler, and the dark markings of the cell are faintly visible by transparency from below. Hind wing: the costa very broadly, the termen much more narrowly black; the black bordering on the latter consists of a series of rounded coalescent spots, which on the inner side are margined by faint dark lunules; these are formed not by actual scaling but by the dark markings of the underside which show through more or less clearly. *Underside*: slightly bluish white; the markings, some black, some dusky, but all large and distinct. Fore wing: a short bar on the discocellulars, an anteriorly inwardly curved, transverse, discal series of seven, more or less elongate spots, of which the spot in interspace 2 is vertical and sinuous, the next above it irregularly oval and obliquely placed, the next smaller and almost round, the fourth placed almost longitudinally, forms a short bar, and the apical three decrease in size to the costa; beyond these is an inner subterminal, transverse, lunular line, an outer subterminal series of transverse spots and a very slender anticiliary line. Hind wing: two basal and three subbasal spots in vertical order; a line on the discocellulars; a spot above it at base of interspace 6; a much larger spot above that in interspace 7; a lower discal irregular transverse series of five spots, followed by terminal markings similar to those on the fore wing, except that the spots in the subterminal row are rounded, not transverse. Cilia of both fore and hind wings white alternated with dusky black at the apices of the veins. Antennæ, head, thorax and abdomen dusky black, the antennæ ringed with white; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: white, the bases of the wings and in some specimens the hind wing posteriorly shot with iridescent blue. Fore wing: costa, apex and termen broadly black; the discocellulars marked with a very short, fine black line that extends down from the black on the costal margin. Hind wing: costa and apex broadly black; termen below vein 6 with a regular subterminal series of black spots in the interspaces, enclosed within an inner lunular and an outer straight slender anticiliary black line; the veins, except vein 5 in the middle, slenderly black. Cilia of both fore and hind wings white. *Underside*: ground-colour and markings similar to those of the ♂. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.—♂ ♀. Differs very slightly from the wet-season brood. In the ♂ there is a small patch of white on the upperside of the fore wing beyond the cell and on the upperside of the hind wing on the anterior portion of the disc; the extent of this patch varies on the fore wing from a mere touch of white just beyond the cell to a large discal area of white which is diffuse with ill-defined margins. In the ♀ the blue iridescence at the base of the wings on the upperside is in some specimens considerably restricted, in others entirely absent. On the underside in both sexes the ground-colour is paler and in form and position the markings are much less prominent, though entirely like those of the wet-season brood.

Exp. ♂ ♀ 32–35 mm. (1·28–1·36″).

Hab. Peninsular India, except in the desert tracts; Ceylon; Assam; Burma; the Andamans; extending into the Malayan Subregion as far as Java.

Var. *lavendularis*, Moore, has the costal and terminal margins of both fore and hind wings more narrowly bordered with black than in typical *puspa*, but seems otherwise indistinguishable.

692. **Cyaniris lilacea**, *Hampson, Proc. Nilgiri N. H. Soc.* 1887, p. 14.
Cyaniris puspa, *var.* lilacea, *Hampson, J. A. S. B.* 1888, p. 356.
Cyaniris crissa, *de N., J. A. S. B.* 1894, p. 31, pl. 2, fig. 12.

♂. *Upperside*: shining purplish-black. Fore wing: costa narrowly and evenly for three-fourths of its length from base, apex broadly and terminal margin decreasingly jet-black; cilia black. Hind wing: costa and apex broadly, termen narrowly, bordered with black; a subterminal series of small round black spots that merge anteriorly into the black at apex; cilia black, tipped with white. *Underside*: opaque chalk-white. Fore wing: the following black markings:—a broad short bar on the discocellulars; a discal transverse series of prominent spots in interspaces 1 to 6, the spot in interspace 1 elongate, in 2 and 3 oval and placed obliquely on the wing, in 4 elongate and pointing obliquely outwards, in 5 and 6 rounded, the spot in interspace 6 shifted a little inwards; beyond these discal markings is a transverse series of slender black lunules, followed by a subterminal series of minute round black spots, one in each interspace and a very slender anticiliary black line; cilia on the underside white. Hind wing: also with the following black markings:—a minute spot at base, followed by two larger spots one above the other, a sinuous short line on the discocellulars, and just beyond it a transverse somewhat curved series of four slightly quadrate spots, two subcostal and two posterior; a discal series of four more spots, the lowest one curved, the next spot round, the next elongate and placed pointing obliquely outwards, lastly the apical spot of the series round; terminal markings and cilia as on the fore wing. Antennæ, head, thorax and abdomen black, the antennæ ringed with white and a white line along the inner and outer orbits of the eyes; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: brownish black. Fore wing: from base for a little more than two-thirds of its length and from the posterior half of the discoidal cell to the dorsum white, beautifully glossed with purplish blue at the upper outer corner of the area indicated above, which is pure white. Hind wing: glossed with blue over a broad central area from base to a broad brownish-black terminal border, on the inner margin of which and partially coalescing with it is a transverse series of large round jet-black spots, inwardly narrowly and obscurely margined with bluish white; this colour at the anterior spots carried as streaks inwards for a short distance. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen also similar.

Exp. ♂ ♀ 36–38 mm. (1·42–1·45″).

Hab. Recorded so far only from the Nilgiris.

693. **Cyaniris albidisca**, *Moore, P. Z. S.* 1883, p. 524, pl. 48, fig. 7 ♂; *Swinhoe, P. Z. S.* 1885, p. 133; *de N. Butt. Ind.* iii, 1890, p. 103.

♂ ♀. Very closely allied to *C. puspa*, from which it differs as follows:—♂. *Upperside*: dull indigo-blue, not so dark as *puspa* when looked at from above vertically and with much less refulgent iridescence in an oblique light; the white on both fore and hind wings much more clearly defined, never diffuse and apparently present at all seasons; on the fore wing the white is limited to the basal portions of interspaces 2 and 3 and does not extend into the cell or above vein 4; on the hind wing it occupies the basal half of interspace 6 and is strictly bounded by vein 7 above and vein 6 below. The terminal margins of both fore and hind wings with much narrower black edgings than in *C. puspa*. *Underside*: differs from that of *puspa* in the markings, which are smaller and much more delicate; on the fore wing the transverse postdiscal series of abbreviated line-like markings is bisinuate, placed further towards the terminal margin and has the component spots somewhat differently arranged; on the hind wing also the spots on the disc posteriorly are more regular than in *puspa*.—♀. *Upperside*: ground-colour and white on disc of wings almost as in *puspa*, but always both in fore and hind wings more limited, the black costal and terminal margins consequently broader. *Underside*: the markings as in the ♂, and therefore differ in a similar manner from those of *C. puspa* ♀. Antennæ, head, thorax and abdomen in both sexes as in *C. puspa*.

Exp. ♂ ♀ 34–39 mm. (1·34–1·52″).

Hab. Appears to be strictly confined to the hills of Southern India at from 2000 to 6000 feet.

694. **Cyaniris placida,** *de N., J. A. S. B.* 1883, p. 68, pl. 1, fig. 8 ♂; *Moore, P. Z. S.* 1883, p. 523, pl. 48, fig. 5 ♂; *de N. Butt. Ind.* iii, 1890, p. 103.

♂. *Upperside*: pale violet. Fore wing: a very slender line along the costa, the apex broadly and the termen decreasingly edged with black. In some specimens this edging is very narrow; in others much broader, occupying at the apex a sixth of the wing. Hind wing: with a similar narrow or broad edging to the termen; the costa edged more or less broadly with fuscous black. *Underside*: dull sullied white; the markings small, delicate and irregular, not unlike those on the underside ♂ *transpecta*, but on the fore wing the series of postdiscal markings is straighter, the elongate spot or short line in interspace 4 less oblique. On the hind wing the discal markings form a strong curve or half loop beyond apex of cell, the subbasal three spots in vertical order, the subcostal spot in interspace 7 and the spot in interspace 2 of the subterminal series are prominently black. The rest of the markings are similar to those borne by all forms of *Cyaniris*.—? ♀. *Upperside*: ground-colour paler violet than in the ♂, turning to white on the disc of the fore and along the costal margin of the hind wing; costa, apex and termen of fore wing and apex of hind wing broadly dusky black, this colour narrows posteriorly along the termen of the hind wing and at the tornal area is reduced to a mere anticiliary line. *Underside*: markings as in the ♂. Antennæ, head, thorax and abdomen in both sexes dusky black; the antennæ as usual ringed with white; beneath: the palpi, thorax and abdomen dull sullied white.

Exp. ♂ ♀ 28–35 mm. (1·10–1·36″).

Hab. Sikhim; Assam; Burma; Tenasserim; extending to the Malay Peninsula.

I am not very certain that I have identified the ♀ correctly.

695. **Cyaniris cyanescens,** *de N. Butt. Ind.* iii, 1890, p. 103, frontispiece, fig. 129 ♂.

♂. *Upperside*: deep blue. Fore and hind wings: costa, apex and termen somewhat narrowly, but more evenly than in most of the forms in the genus, edged with black; the edging to the costa of the hind wing broader, slightly diffuse; the edgings to the termen on both wings narrowed posteriorly. *Underside*: white. Fore wing: a short transverse line on the discocellulars, a postdiscal series of transverse elongate spots or short bars, followed by a transverse connected row of slender lunules and a subterminal transverse series of spots, fuscous brown; of the postdiscal markings the anterior four are slender and form more or less of a curved line, the posterior two are coarser and are shifted inwards; lastly, there is a dark anticiliary line with the cilia beyond whitish grey. Hind wing: a transverse, very obliquely-placed, subbasal series of three black spots and a similarly-coloured large, round, subcostal spot beyond the middle of interspace 7; a slender short discocellular line; a series of posterior discal spots very irregularly placed and terminal markings similar in shape, position and colour to those in the fore wing. Antennæ, head, thorax and abdomen dark brown, the antennæ ringed with white; beneath: the palpi, thorax and abdomen greyish white.—♀. *Upperside*: brown. Fore wing: a postero-medial area from base to disc white, brilliantly glossed with iridescent blue that can only be seen in certain lights; the discocellulars marked by a short transverse brown line. Hind wing: with a medial patch similar to that on the fore wing, not extended however, to the dorsal margin; beyond it a subterminal series of prominent round black spots and an anticiliary slender black line. *Underside*: white. Fore wing: the discocellular short transverse line, the postdiscal and terminal markings much as in the ♂, but the postdiscal transverse series of short bars placed further outwards towards the terminal margin. Hind wing: a spot on the dorsum close to the base of the wing; two (not three as in the ♂) subbasal spots, and a very conspicuous and large round subcostal spot towards the apex in interspace 7, black; the postero-discal markings similar to those in the ♂ but coarser and much more regular; the terminal markings as in the ♂, the subterminal spot very large and prominent. Antennæ, head, thorax and abdomen a paler brown than in the ♂; the antennæ ringed with white; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 30–34 mm. (1·20–1·35″).

Hab. The Nicobars.

Mr. de Nicéville (*l. c.*) describes a variety or race as follows:—"Local race *prominens*, nov. *Female*: *Upperside* fore wing: the blue area more extensive. Hind wing: the marginal spots much larger and blacker. *Underside*: all the markings larger and more prominent, especially the spot just beyond the middle of the costa and the marginal round spots which are inwardly defined by a distinct, narrow, lunulated fuscous line; the discal spots arranged in a regular sinuous band. *Expanse*: ♀ 1·3 inches."

696. **Cyaniris chennelli**, *de N.*, *J. A. S. B.* 1883, p. 72, pl. 1, fig. 10 ♂; *id. Butt. Ind.* iii, 1890, p. 102.

♂. *Upperside*: lavender-blue, varying a little in depth of tint. Fore wing: a very slender line along the costa and an even border to the termen from apex to tornus dusky black. Hind wing: costal and terminal margins with even dusky black borders, slightly broader on the costa than on the termen; on the latter the black border encloses a very indistinct series of round spots of the ground-colour, each spot centred with black, which are more prominent posteriorly than anteriorly. *Underside*: bluish white, in some specimens slightly yellowish white; the markings small, delicate and very regular; the postdiscal transverse series of abbreviated lines on the fore wing bisinuate and nearly as in *C. lanka*, but the series further from the termen and the short lines that compose it not quite end to end but a little *en échelon* one to the other; the terminal markings on both fore and hind wings more or less obsolescent apparently at all seasons.— ♀. *Upperside*: ground-colour similar to that in the ♂. Fore wing: costa, apex and termen very broadly dusky brownish-black; over the blue area the dark veins are somewhat prominent, on the termen the black border occupies in some specimens more than one-third of the wing and in all is very even. Hind wing: the dark veins as conspicuous as on the fore wing; anterior third of wing dusky black, termen with a well-marked anticiliary line and a more or less distinct and complete subterminal series of spots. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen in both sexes dusky black, the antennæ ringed with white; beneath: palpi, thorax and abdomen white.

Exp. ♂ ♀ 31-33 mm. (1·22-1·30″).

Hab. So far recorded only from Shillong in Assam and the Northern Chin Hills in Upper Burma.

697. **Cyaniris musina**, *Snellen, Tijd. v. Ent.* xxxv, 1892, p. 145; *de N. Jour. Bomb. N. H. Soc.* ix, 1895, p. 275, pl. O, fig. 19 ♂.
Cyaniris jynteana, var., *Distant* (*nec de Nicéville*), *Rhop. Malay.* 1886, p. 452, pl. 44, fig. 6 ♂.

♂. *Upperside*: pale lilacine grey. Fore wing: costa bordered by a slender line, termen by a comparatively broad and even band of dusky black, the latter diffuse along its inner margin. Hind wing: costal margin diffusely dusky black, termen with a slender black anticiliary line; dorsal margin narrowly pale. *Underside*: white with a slight tinge of blue. Fore wing: a short line on the discocellulars, a postdiscal transverse series of six abbreviated lines pointing obliquely outwards and *en échelon* one with the other, the uppermost shifted well inwards, followed by a subterminal series of transverse spots enclosed between an inner subterminal, lunular, transverse line and an outer anticiliary slender line, pale brown. Hind wing: a transverse subbasal series of three, sometimes four, minute spots and a spot beyond on the dorsum, with a larger subcostal spot near the apex of the wing, black; a short slender line on the discocellulars and some irregular dots on the disc pale brown; terminal markings as on the fore wing. Cilia of both fore and hind wings whitish. Antennæ, head, thorax and abdomen dark brown, the antennæ ringed with white beneath: the palpi, thorax and abdomen white.—♀. *Upperside*, fore wing: a broad border to the costal and terminal margins dusky black, the rest of the wing iridescent light blue; on the costa the lower edge of the black traverses the middle of the cell, on the apex and termen it occupies the outer fourth of the wing. Hind wing: anterior third dusky black, the rest of the wing pale lilacine glossed with iridescent blue in certain lights; a subterminal series of dusky black spots that more or less coalesces with an anticiliary dusky black line and is enclosed on the inner side by a slender similarly-coloured lunular line. The underside, antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 28–31 mm. (1·12–1·22″).

Hab. Described originally from Western Java. The late Capt. Watson procured a few specimens in the Yaw district in Upper Burma; six of these are now in the collection of the British Museum. I know of no other record of the occurrence of this form from within our limits.

698. **Cyaniris victoria,** *Swinhoe, Trans. Ent. Soc.* 1893, p. 293.

♂. *Upperside*: silvery grey-blue with a very slight iridescence in certain lights of brighter blue, the discal area of both fore and hind wings paler. Fore wing: apex and termen edged with black which is comparatively broad at apex, about a fifth of the wing, and suddenly decreases posteriorly, at the tornus forming merely an anticiliary line. Hind wing: with a slender anticiliary black line. Cilia of fore wing fuscous, of hind wing whiter. *Underside*: uniform rather dark grey; the usual *Cyaniris* markings indicated only by a few scattered blackish dots. Antennæ, head, thorax and abdomen dark greyish brown; the antennæ ringed with white; beneath: the palpi, thorax and abdomen paler.—♀. *Upperside*: similar, slightly more of the iridescent blue gloss about the bases of the wings; the discal area of both fore and hind wings more broadly paler than in the ♂, almost white; the costa narrowly, the apex and termen very broadly of the fore wing, and the costa and apex of the hind wing blackish brown; also on the hind wing there is a subterminal somewhat obsolescent series of dark brown spots. *Underside*: similar to that of the ♂ but the markings are more clearly defined, especially the postdiscal markings which are composed of abbreviated little brown detached lines placed in a well-marked curve. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 29–33 mm. (1·14–1·32″).

Hab. Recorded so far only from the Khási Hills in Assam.

699. **Cyaniris limbata,** *Moore* (Polyommatus), *P. Z. S.* 1879, p. 139; *de N. Butt. Ind.* iii, 1890, p. 109.

♂. *Upperside*: uniform dark purplish-blue. Fore and hind wings: termen narrowly edged with black; costal margin of hind wing more broadly fuscous black. *Underside*: white with a light greyish-blue tint; markings for the most part pale brown, disposed much as in *C. puspa*, smaller, more slender; the transverse discal series of abbreviated lines or elongate spots on the fore wing more regular, the spots more evenly *en échelon*, the spot nearest the costa small and shifted well inwards. Hind wing: the black subcostal spot in the middle of interspace 7 subequal, not larger than the three subbasal spots; the posterior discal series of spots bisinuous, none conspicuously larger than the others. Antennæ, head, thorax and abdomen fuscous black, the antennæ ringed with white, the head and thorax clothed above with long bluish hairs; beneath: the palpi, thorax and abdomen greyish white.—♀. *Upperside*, fore wing: bluish purple, paler outwardly, in certain lights with a resplendent iridescence; costa and apex very broadly, termen somewhat more narrowly fuscous black. Hind wing: as in the fore wing iridescent bluish purple but uniform, not paler outwardly; the costal and terminal margins broadly and evenly fuscous black, this border on the termen with a series of superposed blue lunules. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂ but the thorax and abdomen above not so dark.

Exp. ♂ ♀ 32–36 mm. (1·25–1·40″).

Hab. The hills of Bengal; Southern India: the Nilgiri, Anaimalai and Palni Hills; Ceylon; the hills of Assam.

700. **Cyaniris lanka**, *Moore* (Polyommatus), *A. M. N. H.* (4) xx, 1877, p. 342; *id. Lep. Ceyl.* i, 1881, p. 76, pl. 35, figs. 2, 2*a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 109.

♂. *Upperside*: uniform purplish-blue; an extremely narrow bordering of black to the termen of both the fore and hind wings present in a few specimens, absent in most; also the hind wing is slightly shaded with dusky black along the costa. *Underside*: shining silvery white. Fore and hind wings with the usual *Cyaniris* markings but the postdiscal transverse series of abbreviated pale brown lines on the former almost in line one with the other, the whole series placed slightly obliquely on the wing and appreciably curved. On the hind wing the markings are small and regular, the lower discal series of spots bisinuate. The transverse lunular line beyond the discal markings that is comparatively distinct in most forms, is in this barely indicated on both fore and hind wings. Antennæ, head, thorax and abdomen dusky black; beneath: the palpi, thorax and abdomen snow-white.—♀. *Upperside*: differs from the ♂ in the ground-colour which is slightly paler and on the fore wing by the very broad costal and terminal blackish-brown border; on the hind wing by the similar border to the costal margin, the slightly broader black anticiliary line and a posterior subterminal series of somewhat indistinct black spots. Underside, antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 32–35 mm. (1·25–1·38″).

Hab. Ceylon.

701. **Cyaniris dilecta** (Pl. XIX, fig. 128), *Moore* (Polyommatus), *P. Z. S.* 1879, p. 139; *de N., J. A. S. B.* 1883, p. 68, pl. 1, fig. 5 ♂; *id. Butt. Ind.* iii, 1890, p. 107.

♂. *Upperside*: pale lilac-blue. Fore and hind wings: a very slender black terminal line even in width from apex to tornus on each wing; centre of the disc of the fore and upper discal area of the hind wing pale, in specimens of the dry-season broods turning to white. *Underside*: white with a very faint bluish tint in fresh specimens, markings very delicate and slender in shape and in the position usual in all the forms belonging to the genus; the inner subterminal transverse lunular line on both fore and hind wings. Fore wing: the postdiscal series of markings very slightly oblique, slightly closer to the terminal margin posteriorly than anteriorly, the abbreviated lines or elongate spots composing it *en échelon* one to the other. Hind wing: the subbasal transverse series of three black spots and the subcostal spot in interspace 7 not much larger nor very much more prominent than the others. Antennæ, head, thorax and abdomen brown, the antennæ ringed with white as usual; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: white, tinged with lilac at the bases of the wings. Fore wing: costa, apical third of wing and termen very broadly brown. Hind wing: the anterior third from a line that passes from base through the upper portion of the cell to the termen, brown; a subterminal row of rather distinct brown spots enclosed between a series of obscure lilacine lunules and a black anticiliary line. *Underside*: ground-colour and markings as in the ♂, but on the fore wing the transverse postdiscal series of markings placed comparatively more inwards. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 30–34 mm. (1·18–1·34″).

Hab. The Himalayas· Simla to Sikhim; Assam; Upper Burma; Arracan.

702. **Cyaniris jynteana**, *de N., J. A. S. B.* 1883, p. 69, pl. 1, figs. 7 ♂, 7 *a* ♀; *Moore, P. Z. S.* 1883, p. 524, pl. 48, fig. 10 ♂; *de N. Butt. Ind.* iii, 1890, p. 104.

Cyaniris sikkima, *Moore, P. Z. S.* 1883, p. 524, pl. 48, fig. 11 ♂; *de N. Butt. Ind.* iii, 1890, p. 105.

♂. *Upperside*: purplish-blue or lilac of a deeper shade than in *C. dilecta*. Fore wing: a much broader dusky black terminal margin that widens at apex and is somewhat diffuse along its inner edge. In specimens of the dry-season brood there is a diffuse but prominent discal white patch. Hind wing: costa dusky brownish; termen with a comparatively narrow black border edged on the inner side by a more or less obscure subterminal series of black spots, each spot centred in a background which is slightly paler than the lilac ground-colour. *Underside*: pale greyish-white or bluish-white, with the usual pale brown markings which are small, delicate and regular. Antennæ, head, thorax and abdomen blackish brown, antennæ ringed with white; beneath: palpi, thorax and abdomen white.—♀. "*Upperside* fore wing: all but the middle of the disc (which is white glossed with iridescent blue) black; a discocellular black spot. Hind wing: blackish; white in the middle glossed with blue; along the veins irrorated with black scales; a submarginal series of pale lunules. *Underside*: both wings marked exactly as in the male." (*de Nicéville.*)

Exp. ♂ 32–34 mm. (1·26–1·32").

Hab. Sikhim; hills of Assam; also recorded from the Malay Peninsula.

703. **Cyaniris cœlestina**, *Kollar* (Lycæna) *in Hügel's Kaschmir*, iv, 1848, p. 423; *Moore*, *P. Z. S.* 1882, p. 244; *de N. Butt. Ind.* iii, 1890, p. 106.

Lycæna kollari, *Westwood in Dblday., Westw. & Hew. Gen. Di. Lep.* ii, 1852, p. 491; *Butler* (Cyaniris), *P. Z. S.* 1886, p. 367.

Polyommatus kasmira, *Moore*, *P. Z. S.* 1865, p. 503, pl. 31, fig. 1 ♂.

♂. *Upperside*: lilac-blue (darker on the fore than on the hind wing in most specimens), with in certain lights a slight bright iridescence chiefly apparent along the costal margin and veins of the fore wing. Fore wing: a very slender black line along the costal margin broadened at apex and continued slenderly down the termen to the tornus. Hind wing: ground-colour along the costal margin somewhat broadly paler; termen with a very slender anticiliary jet-black line. Cilia: snow-white on the fore wing alternated very slenderly with black at the apices of the veins. *Underside*: pearly bluish-white. Fore wing: a discocellular, short, transverse, slender brownish streak, a similarly-coloured spot beyond it in interspace 6, followed by three or four duller brown spots in transverse order in interspaces 2 or 3 to 5 and a double transverse subterminal series of lunules. Hind wing: a broad diffuse transverse basal area continued for a short distance down the dorsum, tinted with bluish green; the usual subbasal and discal spots very small; the termen with a subterminal series of lunules and an outer row of spots. In very many specimens the markings of the underside on both fore and hind wings are more or less obsolescent, in some taken at Simla in April and May beyond a black speck here and there the markings are altogether absent.—♀. *Upperside*: paler duskier lilac-blue than in the ♂. Fore wing: costa and termen broadly bordered with dusky brownish-black; a prominent, black, short transverse streak on the discocellulars, beyond it the lilac-blue ground-colour pale, almost white. Hind wing: the blue ground-colour much restricted, the costal and terminal margins broadly blackish-brown, the dorsal margin whitish; the dark colour on the terminal margin traversed by a series of inwardly conical, brown-centred bluish spots and followed by a prominent anticiliary black line. Cilia as in the ♂. *Underside*: very similar to that of the ♂ and similarly with the markings very often obsolescent. Antennæ, head, thorax and abdomen in both sexes dark brownish-black, the antennæ ringed with white, the thorax in the ♂ with blue pubescence; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 33–36 mm. (1·30–1·40″).

Hab. Western Himalayas: Kashmir, Murree, Simla, Mussoorie, Naini Tal.

I am very doubtful whether the next described form, *C. huegeli*, Moore, is distinct from this; a constant difference in size seems to be the chief distinction. Mr. de Nicéville (*l. c.*) says "there is no difficulty whatever in recognizing *C. cœlestina.* Both sexes are considerably smaller than *C. huegeli* and the males have the outer black border on the upperside of the fore wing broader and considerably dilated at the apex." I have not, however, found this latter character at all constant in *C. cœlestina*, and in *C. huegeli* the narrow black border to the fore wing is distinctly though very slightly also dilated towards the apex in all specimens that I have seen.

704. **Cyaniris huegeli** (Pl. XIX, fig. 129), *Moore.*

Lycæna argiolus, *Kollar* (*nec Linnæus*) *in Hügel's Kaschmir*, iv, 1848, p. 423.

Cyaniris huegelii, *Moore, P. Z. S.* 1882, p. 244; *de N. Butt. Ind.* iii, 1890, p. 107.

Race singalensis.

Lycæna singalensis, *Felder, Verh. zool.-bot. Ges. Wien*, xviii, 1868, p. 282; *Moore* (Cyaniris), *Lep. Ceyl.* i, 1881, p. 76, pl. 35, figs. 1, 1 *a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 108.

♂ ♀. Very closely resembles *C. cœlestina.*—♂. *Upperside*: on the whole of a slightly more purple tint than *cœlestina*; black border to the termen of the fore wing generally slightly more even in width from apex to tornus; anticiliary black line on the hind wing slightly broader and slightly diffuse on the inner side. *Underside*: ground-colour and markings similar to those of *C. cœlestina* and much more rarely obsolescent, the posterior two lunules of the inner subterminal series on the fore wing apparently always broad, large and diffuse. Cilia of both fore and hind wings as in *cœlestina.*—♀. In ground-colour and markings on the upperside like a large edition of *C. cœlestina* ♀. On the underside ground-colour and markings as in its own ♂ and similarly with the markings seldom or never obsolescent. Antennæ, head, thorax and abdomen as in *C. cœlestina.*

Exp. ♂ ♀ 42–45 mm. (1·68–1·78″).

Hab. Concurrent with that of *C. cœlestina*, Kollar.

Race **singalensis**, Felder.—♂. *Upperside*: purplish blue with in certain lights a refulgent silvery iridescence, most conspicuous along the costa of the fore wing. Fore and hind wings: a very narrow black edging to the terminal margins narrower on the hind wing than on the fore wing, not dilated towards the apex of the latter. Cilia conspicuously white. *Underside*: silvery white with a slight tinge of blue; both fore and hind wings with the usual *Cyaniris* markings. Fore wing: the postdiscal series of abbreviated lines or elongate spots pale brown, very regular, placed almost end to end, the series slightly curved and not closer to the termen posteriorly than anteriorly. Hind wing: the markings pale brown, regular but small, the subbasal transverse series of three spots and the subcostal spot in interspace 7 black, the latter not larger than the others. Both fore and hind wings: with the spots of the subterminal series very small, mere black dots; the inner subterminal series of markings lunular and generally somewhat blurred, the posterior lunules on the fore wing distinctly broadened as in the typical form but not so prominently; finally, the anticiliary black line very slender and clearly defined. Antennæ, head, thorax and abdomen blackish, the antennæ ringed with white, the thorax clothed with purplish-blue pubescence; beneath: palpi, thorax and abdomen white.—♀. *Upperside*, fore wing: costa and termen very broadly blackish brown; the remainder of the wing purplish blue, paling almost to white towards the anterior, outer portion. Hind wing: costa broadly, termen and dorsum more narrowly blackish brown, the rest of the wing pale purplish blue, the colour getting still paler on the anterior and outer portion as on the fore wing; the blackish-brown edging on the terminal margin reduced posteriorly to an anticiliary black line within which there is a transverse series of subterminal black spots enclosed further inwards by an obscure series of dark lunules. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similar but darker.

Exp. ♂ ♀ 34–38 mm. (1·36–1·50″).

Hab. Southern India; Ceylon.

Genus LYCÆNA.

Lycæna, sectn. iii, pt., *Fabr. Illig. Mag.* vi, 1807, p. 286; *Herrich-Schäffer, Syst. Bearb. Schmett. Eur.* i, 1843, p. iii; *de N. Butt. Ind.* iii, 1890, p. 66.

Type, *L. meleager*, Hübner, from Europe.

Range. Palæarctic, Nearctic, Indo-Malayan.

♂ ♀. Fore wing: costa slightly arched; apex acute or blunt, never rounded; termen convex; dorsum straight; cell little more than half length of wing; vein 6 from apex of cell, vein 7 shifted further back towards base of wing, their bases comparatively well separated, vein 5 equidistant at base from bases of 4 and 6; upper discocellular in line with subcostal, middle and lower discocellulars subequal; vein 8 absent, 9 out of 7, 10 and 11 from apical half of subcostal, 12 at apex bent slightly towards 11. Hind wing: pear-shaped; costa and dorsum subequal, the former slightly arched towards apex, the latter straight; termen strongly arched; cell slightly shorter than half length of wing; veins 3 and 4 distinctly separated at base, the former from a little before, the latter from lower apex of cell; vein 7 from apical half of subcostal; vein 8 strongly arched at base, then straight to apex running very close to costal margin. Antennæ about half length of fore wing; club well-marked, oval, pointed at tip; palpi subporrect, scaled, with short stiff hairs in front, third joint moderately long; eyes naked or hairy; legs slender. ♂. Fore legs: tibiæ and tarsi tapered, the latter long, exarticulate, spined beneath. ♀. Fore legs normal, with minute claws.

Key to the forms of Lycæna.

- A. Eyes not hairy.
  - *a*. Brown without any blue colouring on upperside.
    - a'. Underside hind wing: ground-colour brown or brownish grey.
      - a^2. Upperside fore and hind wings: well-marked subterminal series of black spots, bordered outwardly by a series of orange-red lunules .... *L. astrarche*, p. 337.
      - b^2. Upperside fore and hind wings: uniform, no subterminal series of orange-red lunules .... *L. iris*, p. 337.
    - b'. Underside hind wing: ground-colour pale metallic green .... *L. younghusbandi*, p. 338.
  - *b*. With more or less of blue colouring on upperside in ♂.
    - a'. Underside hind wing: ground-colour grey or brownish grey.
      - a^2. Underside hind wing; subterminal series of spots present and speckled with metallic green scales .... *L. christophi*, race *samudra*, p. 346.
      - b^2. Underside hind wing: subterminal series of spots present or absent; when present not speckled with metallic scales.
        - a^3. Upperside fore wing: without a trace of discal spots.
          - a^4. Cilia of both fore and hind wings: white conspicuously spotted with black .... *L. hylas*, p. 351.
          - b^4. Cilia of both fore and hind wings: white or grey, not spotted with black or at any rate not conspicuously so.
            - a^5. Underside hind wing: discal spots black, each encircled with white .... *L. loewii*, p. 343.
            - b^5. Underside hind wing: discal spots entirely white.
              - a^6. Upperside: ground-colour purplish blue; fore wing rounded at apex.. *L. pheretes*, race *lehana*, p. 352.
              - b^6. Upperside: ground-colour deep metallic blue: fore wing acute at apex .... *L. pheretes*, race *asiatica*, p. 353.

- b^3. Upperside fore wing: with a transverse discal series of spots paler than ground-colour, sometimes obsolescent but always plainly indicated.
  - a^4. Upperside fore wing: blue colour extended from base to at least the discal spots.
    - a^5. Underside hind wing: without a terminal "double series of coalescent white lunules" .... *L. orbitulus*, race *jaloka*, p. 349.
    - b^5. Underside hind wing: with a terminal "double series of coalescent white lunules" .... *L. orbitulus*, race *jaloka*, var. *leela*, p. 350.
  - b^4. Upperside fore wing: blue colour restricted to immediate base of wing .... *L. orbitulus*, race *jaloka*, var. *ellisi*, p. 350.
- b'. Underside hind wing: ground-colour metallic green.
  - a^2. Upperside fore and hind wings: blue colouring very regular, extended almost to terminal margins .... *L. galathea*, p. 348.
  - b^2. Upperside fore and hind wings: blue colouring spread somewhat irregularly, restricted to basal two-thirds of wings .... *L. omphisa*, p. 347.

B. Eyes hairy.

- *a*. Upperside fore wing: blue colouring irregular, restricted to basal two-thirds of wing .... *L. devanica*, p. 344.
- *b*. Upperside fore wing: blue colouring spread more evenly and regularly over at least three-fourths of wing from base.
  - a'. Underside hind wing: ground-colour between discal and subterminal markings with irregular patches of white.
    - a^2. Underside: ground-colour dark grey, spots and markings large and distinct .... *L. sarta*, p. 345.
    - b^2. Underside; ground-colour paler grey, in some specimens nearly white; terminal markings more or less obsolescent; often a white streak in cell extended to white patch between discal and subterminal markings .... *L. stoliczkana*, p. 341.
  - b'. Underside hind wing: ground-colour between discal and subterminal markings uniform, with no white patches.
    - a^2. Upperside: pale bright purple .. *L. icarus*, p. 339.
    - b^2. Upperside: shining, glossy, electric blue .... *L. eros*, race *balucha*, p. 340.

705. **Lycæna astrarche** *, *Bergstr.* (Papilio) *Nomencl.* iii, 1779, pl. 49, figs. 7, 8: *Staud.* (Lycæna) *Cat. Lep.* i, 1901, p. 83.
Polyommatus nazira, *Moore, P. Z. S.* 1865, p. 504, pl. 31, fig. 4.
Lycæna medon, *de N.* (*apud Hufnagel*), *Butt. Ind.* iii, 1890, p. 69.

♂ ♀. *Upperside*: brown with a silky sheen in certain lights. Fore wing: a black spot on the discocellulars. Hind wing: an anticiliary black line. Fore and hind wings: a subterminal, transverse, slightly curved series of black spots, inwardly bordered by a transverse series of orange-red lunules; cilia white, spotted inwardly at the terminations of the veins with black. *Underside*: ground-colour a warm dark grey. Fore wing: a spot on the discocellulars, a transverse, discal, bisinuate series of seven spots, a transverse, subterminal, slightly curved series of six spots and an anticiliary line, black; the discocellular spot and the discal spots encircled with white, the subterminal spots inwardly bordered by larger orange-red spots, which in turn are inwardly margined narrowly with black, the anterior ones with specks of white again on their inner sides; outwardly the spots of the subterminal series are conspicuously bordered with white; cilia grey. Hind wing: a transverse, subbasal series of four spots, followed by a spot in middle of interspace 7, another at the base of interspace 6, a speck on the discocellulars, and an outwardly oblique, somewhat sinuate posterior, discal series of five spots, black, all enclosed with white which colour forms a comparatively large postdiscal patch; beyond is a strongly curved series of nine orange-red larger spots succeeded by a subterminal similarly curved series of seven black spots on a white ground, and an anticiliary black line; the tornal three of the orange-red series of spots are coalescent; cilia white, dusky grey at the terminations of the veins. Antennæ, head, thorax and abdomen brown, the shafts of the antennæ ringed with white; beneath: the club of the antennæ, the palpi, thorax and abdomen white, the palpi with some stiff black hairs.

Exp. ♂ ♀ 26–29 mm. (1·04–1·11″).

Hab. The Palæarctic Region (except the Polar area). Within our limits, the Himalayas: Chitral, Kashmir, Simla to Kumaon; Baluchistan.

706. **Lycæna iris**, *Staudinger, Stett. ent. Zeit.* 1886, p. 207; *Gr.-Grshim. Rom. Mém., Lep.* iv, 1890, p. 378, pl. 7, fig. 8.

♂ ♀. *Upperside*: uniform rich silky brown. Fore and hind wings: short, black, transverse streaks or elongate spots on the discocellulars; in some specimens, in addition, there are one or two

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* The specific names *alexis* var. 1, Scopoli, and *medon*, Hufnagel (*nec* Esper), have priority over *astrarche*, Bergsträsser, but the former name has been, and is still by many authors, applied to our common English "blue," while Hufnagel's description of his "*medon*" is quite insufficient.

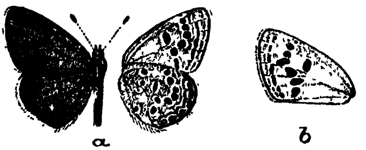

Fig. 80.
a. *Lycæna iris.*
b. *Lycæna iris*, var. Underside fore wing.

subterminal, obscure, small black spots near the tornal angle. Cilia prominently white. *Underside*: brownish grey. Fore wing: the following white-encircled jet-black spots:—a large oval spot on the discocellulars; a transverse, bisinuate, discal series of six spots, the lower two arranged in a slightly oblique line directly beneath the discocellular spot, the next spot above further outwards towards the termen, the remaining three still further outwards, in transverse slightly oblique line to the costa, the posterior spot of the whole series slightly elongate and curved; beyond these are an inner and an outer transverse somewhat maculated line and an anticiliary unbroken line darker than the ground-colour, the innermost of the three lines bordered inwardly with whitish. Hind wing: a subbasal, transverse line of four well-separated spots, a short streak or elongate transverse spot on the discocellulars and a bisinuate, transverse, discal series of six spots jet-black, each spot with a slender ring of white; the posterior but one spot of the subbasal line is minute, and the posterior spot of the discal series slightly elongate and curved. The terminal markings consist of a transverse, curved, subterminal series of brown spots darker than the ground-colour, bordered inwardly by a series of lunules and outwardly by an anticiliary prominent line of the same tint, the lines of lunules edged inwardly and somewhat obscurely with white; the posterior two spots of the subterminal series jet-black, set in an ochraceous-yellow background and speckled with metallic blue. Antennæ black, the shafts ringed with white; head, thorax and abdomen brown; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 29–30 mm. (1·13–1·18").

Hab. Within our limits recorded from Chitral. Described originally from Central Asia.

707. **Lycæna younghusbandi**, *Elwes, P. Z. S.* 1906, p. 484, pl. 36, fig. 10 ♂.

♂. *Upperside*: dark satiny brown with a slightly plumbeous tint in certain lights, more apparent towards the bases of the wings than over the outer portions. Fore and hind wings: nearly uniform, with only slender black anticiliary lines and the discocellulars of the fore wing marked by a transverse short black streak; edge of the costa of fore wing and cilia of both wings snow-white. *Underside*, fore wing: grey; a lunular short black line on the discocellulars and a transverse discal series of six black spots, each encircled with white, followed by a subterminal, very obscure, transverse row of slender dusky spots, of which the anterior spots are barely indicated, the posterior three or four obsolescent but traceable. Hind wing: pale metallic green; a broad terminal edging grey; the ground-colour bounded outwardly by an obscure series of dusky spots that are suffused with metallic green. Antennæ, head, thorax and abdomen dark brown, shafts of the antennæ ringed with white; beneath: palpi, thorax and abdomen white.

Exp. ♂ 34 mm. (1·34").

Hab. Tibet: Gyantze; Sikhim: Chumbi Valley, Phari.

This form, collected by Capt. Walton, I.M.S., during the late Tibet Expedition, is very close to, even if it can be considered at all distinct from *L. felicis*, Oberthür, which was also abundant at Gyantze. I have been quite unable to identify and separate the ♀ from the females of *felicis*. The chief points of difference in the ♂ are "the dark leaden grey instead of greyish-brown colour above" and the obsolescence of the terminal markings.

708. **Lycæna icarus**, *Rottenburg* (Papilio), *Naturf.* vi, 1775, p. 21.

Lycæna icarus, *var.* persica, *Bienert, Lep. Ergebn.* 1870, p. 29.

Polyommatus yarkundensis, *Moore, A. M. N. H.* (5) i, 1878, p. 229; *id. Sci. Res. Second Yark. Miss., Lep.* 1879, p. 6, pl. 1, fig. 8; *de N. Butt. Ind.* iii, 1890, p. 75.

Polyommatus kashgarensis, *Moore, A. M. N. H.* (5) i, 1878, p. 230; *id. Sci. Res. Second Yark. Miss., Lep.* 1879, p. 5, pl. 1, fig. 7; *de N. Butt. Ind.* iii, 1890, p. 75.

Lycæna persica, *Butler, P. Z. S.* 1880, p. 407; *de N. Butt. Ind.* iii, 1890, p. 74.

Lycæna fugitiva, *Butler, P. Z. S.* 1881, p. 606; *de N. Butt. Ind.* iii, 1890, p. 74.

♂ ♀. Eyes hairy. ♂. *Upperside*: purplish blue, with a rich satiny lustre in certain lights. Fore and hind wings: purer darker blue at base, with anticiliary, black, slender lines on both wings. In some specimens this line on the hind wing is bordered by a row of black spots in the interspaces, some of which latter become obsolescent posteriorly. Cilia white. *Underside*: pale opaque grey; bases of both fore and hind wings and the dorsal margin of the latter wing broadly and diffusely irrorated with greenish-blue scales. Fore wing: a spot in middle of cell, a spot below it in interspace 2, a transverse spot on the discocellulars and a transverse bisinuate discal series of rounded spots black, each encircled narrowly with white; beyond these a transverse slightly curved series of dusky lunules and a slender dark anticiliary line, the portions of the ground-colour enclosed between them at the apices of the interspaces slightly paler, each interspace with a dusky black spot. Hind wing: a subbasal transverse series of four spots, a strongly curved transverse discal series of seven smaller spots, a transverse postdiscal series of eight slender lunules and a subterminal series of seven spots, black; the subbasal and discal spots narrowly encircled with white, the postdiscal series of lunules outwardly bordered with pale reddish brown; finally, a dusky short line on the discocellulars and an anticiliary very slender pale brown line. Antennæ dark brownish-black, the shafts conspicuously ringed with white, head, thorax and abdomen with tufted pale bluish pubescence; beneath: palpi white, with a fringe of stiff black hairs, thorax with bluish hairs paler than on the upperside, abdomen white.— ♀. *Upperside*: very dark brown; both fore and hind wings overlaid from base outwards with a dense irroration of blue scales. The extent of this irroration is very variable, in some it is confined to the basal area of the wings, in others it spreads diffusely outwards over about the basal two-thirds of the fore wing and up to the disc on the hind wing. Fore wing: the terminal margin evenly dark brown, of a shade darker than the ground-colour, almost black in some specimens; within this is a subterminal transverse series of conspicuous orange-red spots, the spots become obsolete towards the apex, in a few specimens only the posterior spots are distinct. Hind wing: a subterminal series of black spots inwardly margined with orange-red, and an anticiliary slender black line generally indistinct. *Underside*: ground-colour and markings more or less as in the ♂, but the ground-colour is a darker more brownish grey, the spots large and more prominently encircled with white; in many specimens the white encircling the discocellular black spot and the discal black spots in interspaces 3 and 4 on the hind wing are diffusely spread outwards in a manner similar to the same markings on the hind wing of *L. stoliczkana*. Cilia white. Antennæ as in the ♂, head, thorax and abdomen with darker but similar pubescence; beneath: palpi, thorax and abdomen white, the latter two in a few specimens very pale bluish.

Exp. ♂ ♀ 32–36 mm. (1·28–1·42″).

Hab. The Palæarctic Region (except the Polar area). Within our limits, the Himalayas: Chitral, Ladakh; Baluchistan.

The above description is from specimens taken at Quetta and in the Chitral Valley. I am quite unable to separate them or the specimens so labelled of *persica*, *yarkundensis*, *kashgarensis* and *fugitiva* in the British Museum from English and European specimens of the "Common blue." *L. fugitiva*, Butler, so far as the type-specimen is concerned, seems to be the most distinct; the ground-colour on the upperside is paler, more purple, but other specimens of the same variety grade into typical *icarus*.

709. **Lycæna eros**, *Ochsenheimer, Schmett. Eur.* i, 1808, p. 42.

Race balucha.

Lycæna balucha, *Moore, J. A. S. B.* 1884, p. 24; *Swinhoe, Trans. Ent. Soc.* 1885, p. 340.

Race **balucha**, Moore.— ♂. *Upperside*: shining opalescent purplish blue. Fore wing: costa margined with a very slender white line, edged below the apical two-thirds still more narrowly with black; termen edged with a broader black line, that inwardly is slightly diffuse and is also produced inwards, as is the narrow black edging on the apical portion of the costa, for a very short distance along the veins. Hind wing: costal margin slightly and diffusely fuscous; apex and termen narrowly edged with black, which is produced along the veins as on the fore wing; this black edging is broadest anteriorly and dwindles to a very slender anticiliary line posteriorly, which is continued upwards from the tornal angle for a short distance along the dorsum, above it the dorsal margin is whitish. *Underside*: shining silvery grey. Fore wing: with the following small black spots, each encircled with silvery white :—a spot in basal half of cell, a spot below it in interspace 1, a transverse spot on the discocellulars and a transverse discal sinuate series of seven spots, the anterior four placed in a curve, the posterior two spots often geminate; beyond these are a transverse postdiscal series of dusky black lunules, each edged outwardly with very pale ochraceous, another similar series of transverse dusky spots and an anticiliary slender fuscous black line. Hind wing: a small patch of blue scaling at base, a transverse well separated subbasal series of four small black spots and a discal, anteriorly strongly curved series of eight similarly-coloured spots all encircled slenderly with silvery white; terminal markings as on the fore wing, but very slender and black, the postdiscal row of lunules and the subterminal row of black spots strongly curved, the outward edging to the lunules brighter and more pronounced. Cilia of both fore and hind wings white. Antennæ black, the shafts as usual ringed with white; head, thorax and abdomen with blue pubescence; beneath: the palpi, thorax and abdomen white. —♀. *Upperside*: brown; base of fore and hind wings with a little blue scaling that is continued obscurely along the dorsum, and anticiliary slender black lines on both wings. Fore wing: a posterior transverse subterminal series of three or four bright ochraceous spots. Hind wing: similar ochraceous lunular spots edging a posterior row of jet-black spots that become obsolescent anteriorly. Cilia of both fore and hind wings white, broad and prominent. *Underside*: ground-colour dark brownish-grey, the markings similar but the terminal markings on both fore and hind wings fainter, not so well-defined. Antennæ as in the ♂; head, thorax and abdomen brown, the thorax in some specimens clothed with a few bluish hairs; beneath: the palpi, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 28–32 mm. (1·10–1·26″).

Hab. Baluchistan.

710. **Lycæna stoliczkana** (Pl. XIX, fig. 130), *Felder, Novara Reise, Lep.* ii, 1865, p. 283, pl. 35, figs. 10, 11, ♂; *de N. Butt. Ind.* iii, 1890, p. 73.

Polyommatus ariana, *Moore, P. Z. S.* 1865, p. 504, pl. 31, fig. 2 ♂; *id. Sci. Res. Second Yarkand Mission, Lep.* 1879, p. 6; *de N. Butt. Ind.* iii, 1890, p. 72.

Lycæna sutleja, *Moore, P. Z. S.* 1882, p. 246; *de N. Butt. Ind.* iii, 1890, p. 73.

♂ ♀. Eyes hairy. ♂. *Upperside*: purplish blue, with in certain lights a much brighter but paler silvery blue gloss than in *L. icarus*. Fore and hind wings: terminal margins from very narrow to a width of about one-fifth of the wings dark brown; discocellulars especially of the fore wing in some specimens with a transverse dark brown spot or short line. Cilia snow-white. *Underside*: grey, bases of the wings with a dense patch of bluish scales. Fore wing: sometimes with a black spot in the cell and another below it in interspace 1, very often these spots absent; a transverse black spot slenderly encircled with white on the discocellulars, and a transverse somewhat sinuate discal series of six similarly-coloured rounded spots beyond; these are followed by a transverse subterminal series of dusky spots, sometimes slenderly sometimes broadly encircled with white, and an anticiliary slender black or dusky line. In some specimens a second inner postdiscal row of dusky spots follows the discal markings. These terminal markings vary much in intensity. In many specimens probably from dry arid localities the terminal markings are very faint and ill-defined, the ground-colour towards the terminal margin changing to white, very faintly if at all tinged with grey. Hind wing: a subbasal transverse series of four and a discal strongly curved, almost medially angulate, series of seven black dots widely encircled with white; discocellular spot white, sometimes transversely traversed by a short black line; a broad, somewhat diffuse and ill-defined white streak beyond the middle of the discal series, extended in some specimens to the terminal margin. In a few individuals the discocellular white spot and the above-mentioned streak are joined by slender prolongations from the former. Terminal markings, which are often very ill-defined, consist of a transverse, curved, postdiscal series of slender black lunules with or without broad ochraceous outer edgings to each lunule (sometimes these ochraceous edgings are very dark and well-defined—var. *sutleja*), and a subterminal series of small dusky spots on a white background followed by an anticiliary slender black line. Cilia of both fore and hind wings prominently white. Antennæ black, the shafts ringed with white as usual; head, thorax and abdomen with purplish-blue pubescence; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: very variable; ground-colour pale to dark brown; in some specimens almost uniform without terminal markings on either fore or hind wing, only with the bases of the wings darker and more or less irrorated with blue scales: other specimens however, bear on both fore and hind wings a subterminal more or less incomplete row of ochraceous-red, inwardly conical spots, the number of which vary greatly in var. *sutleja*, Moore, the fore wing has five of these spots, the hind wing six, the posterior two of which are geminate. In most specimens however, there is an anticiliary dark or black well-marked line on both fore and hind wings. *Underside*: as in the ♂, but the ground-colour much darker, more often a brown of a tint paler than on its upper side, than greyish-brown; markings similar to those of the ♂ but better defined, both fore and hind wings with a postdiscal transverse series of slender black lunules always edged outwardly with ochraceous, this edging faint in some specimens, rich ochraceous red in others. Antennæ as in the ♂ ; head, thorax and abdomen dark brown; beneath: the palpi, thorax and abdomen dusky white.

Exp. ♂ ♀ 31–42 mm. (1·2–1·66″).

Hab. The Himalayas: from Chitral and Kashmir to the Chumbi Valley in Native Sikhim.

From the measurements given above it will be seen that this form varies as much in its size as in the character of its markings.

711. **Lycæna loewii**, *Zeller, Isis,* 1847, p. 9; *Lang, Butt. Eur.* 1884, p. 141; *de N. Butt. Ind.* iii, 1890, p. 79, pl. 26, fig. 167 ♂.
Lycæna chamanica, *Moore, J. A. S. B.* 1884, p. 23; *de N. Butt. Ind.* iii, 1890, p. 79.

♂. *Upperside*: a beautiful purplish-blue changing in certain lights to deep blue; veins of both fore and hind wings jet-black, outwardly very conspicuous. Fore wing: costa very slenderly, termen from apex to tornus much more broadly and evenly black. Hind wing: costa broadly, termen a little more narrowly and dorsum broadly dusky black; posteriorly the blue ground-colour between the conspicuous black veins terminates in each interspace in an intense black spot that contrasts strongly with the duller black on the terminal margin; outwardly these black spots are separated from an anticiliary intense black line by a slender edging of bluish-white scales. Cilia of both fore and hind wings white with their basal halves dusky black. *Underside*: brownish grey. Fore wing: a prominent, discocellular, transverse, white-encircled black spot; a transverse discal row of six comparatively large black spots edged very slenderly on the inner side, very broadly on the outer side with snow-white, the anterior five spots of the row placed in a slight curve, the upper four round, the lower spot larger, oval and obliquely placed; the lowest posterior spot of the row also large, elongate, sometimes composed of two geminate spots placed vertically under and out of line of the curve formed by the anterior five; these are followed by a broad transverse postdiscal blackish-brown band, a terminal catenulated transverse white band, each link of which is centred with a dusky black spot and an anticiliary, very prominent, somewhat lunular black line. Hind wing a transverse subbasal series of four black spots, a transverse discocellular spot and a discal series of six similar spots, the anterior five of which are placed in a semicircular curve, vertically below which the posterior spot, which is sometimes double and geminate, is posited out of line of the curve formed by the anterior five. All these spots encircled with white, which on the outer side of the discal series of spots entirely replaces the ground-colour up to the terminal margin. On the white area are superposed a transverse, postdiscal, highly curved series of connected black lunules, a subterminal series of small black spots, one in each interspace, and an anticiliary slender black line; the posterior two spots of the subterminal row are inwardly edged with bright ochraceous and sprinkled with metallic blue scales. Antennæ black, the club touched with white apically and the shaft ringed with the same colour; head, thorax and abdomen black with a little blue pubescence; beneath: the palpi, thorax, abdomen white.—♀. *Upperside*: brown or fuscous brown. *In Baluchistan specimens*; fore wing: with postdiscal inner and outer transverse series of whitish spots, the inner series much more clearly defined; a faint black spot on the discocellulars and an anticiliary dark line. Hind wing: a similar incomplete series of white spots followed by a row of obscure black spots that are outwardly edged very slenderly but conspicuously with white, and have the subtornal two spots crowned inwardly with ochraceous red; an anticiliary dark line as on the fore wing. *In Chitral specimens*: on the fore wing the postdiscal series of spots is absent or only faintly indicated; occasionally there is an obscure transverse series of two or three dull black spots crowned inwardly with ochraceous red. Hind wing: more or less as in Baluchistan specimens, but the postdiscal series of white spots absent or barely indicated, the other markings not so clearly defined. *Underside*: in specimens both from Baluchistan and Chitral, as in the ♂, the ground-colour more brownish, the markings large and clearly defined.

Exp. ♂ ♀ 30–38 mm. (1·18–1·50″).

Hab. Asia Minor; Persia; Chitral; Baluchistan.

Var. *chamanica*, Moore.—The ♂ is slightly paler blue on the upperside, on the underside the markings though small are precisely as in *L. loewii*.

712. **Lycæna devanica,** *Moore* (Polyommatus), *P. Z. S.* 1874, p. 573, pl. 66, fig. 4 ♂; *de N. Butt. Ind.* iii, 1890, p. 71.

♂. *Upperside*: dusky brown with more or less of a dense irroration of blue scales that spreads from the bases of the wings outwards towards the termen. The amount of this blue scaling is irregular and variable; on the fore wing it never extends up to the apex or terminal margin; on the hind wing never further than the disc. Fore wing: a short transverse line or elongate spot on the discocellulars and a slender black anticiliary line. Hind wing: without markings; in a few specimens traces of one or two subterminal dusky spots near the tornal angle; a slender black anticiliary line as on the fore wing. Cilia of both fore and hind wings white. *Underside*: greyish brown; bases of both fore and hind wings irrorated with blue scales. Fore wing: with the following black, white-encircled spots:—a transverse spot on the discocellulars, a curved series of five, sometimes six, discal spots and a subterminal transverse complete series of smaller spots, the spots in the latter series dusky black, paler than those of the discal series; bordering the white edging to the subterminal series of spots on the inner side, is another obscure transverse row of dusky spots that are not encircled with white; lastly, a prominent anticiliary black line. Hind wing: a subbasal transverse series of four spots, an outwardly angulated discal series of eight spots, the posterior two geminate, followed by a strongly curved postdiscal series of slender lunules, a subterminal series of smaller spots and an anticiliary slender line, black, each spot is encircled with white; discocellulars marked by a large, irregular, white spot, that in some specimens is transversely traversed by a short slender black line; the outer white edging to the middle spots of the discal series is produced irregularly outwards and forms a small patch, and the postdiscal series of lunules is bordered on the outer side by pale ochraceous red. Cilia of both fore and hind wings white, alternated with fuscous brown at the apices of the veins. Antennæ black, the shafts ringed with white, head and thorax with bluish-grey pubescence, abdomen dusky black; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: uniform dark brown with in certain lights a satiny lustre. Fore wing: the discocellular transverse black spot obscure, seen more by transparency from the underside than marked by actual scaling. Fore and hind wings: cilia prominent, snow-white. *Underside*: similar to the underside in the ♂, the ground-colour a shade darker. Antennæ, palpi, thorax and abdomen beneath as in the ♂; on the upperside, the head, thorax and abdomen black, clothed more or less with brownish pubescence.

Exp. ♂ ♀ 34–38 mm. (1·35–1·50″).

Hab. Kashmir; Ladakh.

The next form, *L. sarta*, Alph., is very closely allied to *devanica* and is probably only a race of that insect. I have kept it separate because in Indian specimens the ♀ differs completely from the ♀ of *devanica*. In Central Asia, however, the ♀ of *L. sarta* is uniform brown on the upperside, like that of *L. devanica*.

713. **Lycæna sarta**, *Alphéraky, Hor. Soc. Ent. Ross.* xvi, 1881, p. 387, pl. 14, fig. 8.

♂. *Upperside*: dark brown, overlaid on both fore and hind wings from the base outwards with bluish purple, this colour variable in extent but not reaching to the terminal margins in any specimens, and only up to or a little beyond the discs of the wings in very many. In all specimens the immediate base of the wings is suffused more or less prominently with pale blue, which is continued for a short distance down the dorsal margin of the hind wing. Fore and hind wings: an anticiliary dark line and the hind wing in many specimens with a subterminal series of dark spots; cilia white. *Underside*: brownish grey. Fore wing: a discocellular and a transverse discal series of black spots, each spot encircled with white; the latter markings somewhat variable, in some specimens the discal series consists of five spots arranged in an outward curve, in others of six arranged in a transverse bisinuate line; in nearly all specimens that I have seen the edging of white on the outer side is spread diffusely outwards; beyond these there are in some specimens a subterminal inner and an outer maculated narrow transverse band, each band edged on the outer side narrowly and somewhat obscurely with white followed by an anticiliary slender black line; in other specimens the outer dark maculated band becomes a prominent, catenulated, terminal white band, each link centred with a dark spot. Hind wing: a transverse subbasal series of four and a discal series of eight black spots, each spot encircled with white; the discal series angulated outwardly on vein 5, its posterior two spots geminate, the outer white edging spread more or less diffusely outwards, generally only in the middle of the series; the discocellular spot is in most specimens large and pure white, in a few it is transversely traversed by a slender, very short, black line: the terminal markings consist of a curved subterminal series of dark spots edged outwardly with white, inwardly with ochraceous, between which latter and the discal markings is a curved transverse series of dark lunules; lastly, an anticiliary slender black line as on the fore wing. Antennæ black, the shafts ringed with white; head, thorax and abdomen dark brown clothed with a little purplish-blue pubescence; beneath: the palpi, thorax and abdomen white, the palpi with a fringe of stiff black hairs mixed with the white.—♀. *Upperside*: costa broadly, termen decreasingly from apex to tornus dark brown; rest of the wing dark shining yellow, suffused for about two thirds from base with light brown that leaves a transverse broad postdiscal band of the yellow ground-colour prominently apparent, the inner margin of the broad, dark brown, terminal edging vandyked. Hind wing: dark brown; a subterminal series of yellow, inwardly pointed, large, cone-shaped coalescent spots; the bases of the spots rest on an anticiliary brown line and bear each a dark brown spot that is very near to and in some specimens anteriorly touches the anticiliary line, the posterior two brown spots geminate. Cilia of both fore and hind wings white alternated with fuscous. *Underside*: precisely similar to that of the ♂. Antennæ as in the ♂; head, thorax and abdomen above dark brown without any blue pubescence; beneath: as in the ♂.

Exp. ♂ ♀ 34–37 mm. (1·35–1·46").

Hab. Within our limits, Chitral. Described originally from Asiatic Russia.

714. **Lycæna christophi,** *Staudinger, Stett. ent. Zeit.* 1874, p. 87.

Race samudra.

Polyommatus samudra, *Moore, P. Z. S.* 1874, p. 574, pl. 67, fig. 2 ♂; *de N. Butt. Ind.* iii, 1890, p. 78.

Race **samudra,** Moore.—♂. *Upperside*: pale lavender-blue. Fore and hind wings: termen somewhat broadly and diffusely fuscous black; costal margin and apex of hind wing more broadly so; in fresh specimens the bluish scaling on the hind wing posteriorly is carried nearly to the terminal margin, this gives the wing an appearance of a posterior terminal series of three or four large fuscous black spots, one in each interspace; cilia white. *Underside*: pale grey. Fore wing with the usual transverse discocellular and discal series of six white-encircled black spots, no spot in the cell or in interspace 1; the discal row of spots regular (not sinuate), slightly curved, very obliquely placed, sloping posteriorly inwards, the four posterior spots in the series large and posited *en échelon*; these are followed by a double subterminal series of dusky lunules and a slender anticiliary black line; the series of lunules become in many specimens obsolescent anteriorly. Hind wing: the markings much as in the ♀ of *L. balucha*, but the discal series of spots is placed further inwards, the spots of the subterminal row are speckled with minute metallic green scales, and the ochraceous edging to the transverse series of black lunules is wanting.—♀. *Upperside*: brown, the bases of the wings irrorated with bluish-grey scales, the irroration extended irregularly along the dorsal margin of the hind wing. Cilia of fore and hind wings conspicuously white. *Underside*: ground-colour as in the ♂; markings slightly larger, more clearly defined. Fore wing: the transverse discal series of spots bisinuate, the posterior three spots of the series distinctly larger than the others, the middle spot of these three shifted inwards; the terminal markings consist of a transverse postdiscal series of black lunules edged outwardly with bright ochraceous, followed by a transverse series of black spots and an anticiliary black line, all very clearly defined. Hind wing: markings very similar to those of the ♂, but the discal series of spots is closer to the base of the wing and the postdiscal transverse row of black lunules is prominently edged outwardly with ochraceous. In both sexes the antennæ are black, the shafts ringed as usual with white; the head, thorax and abdomen are dark brown or black with a more or less dense clothing of purplish-blue hairs and scales; beneath: the palpi, thorax and abdomen white.

Exp. ♂ ♀ 30–33 mm. (1·18–1·30").

Hab. Within our limits, Baltistan: Gol, Skardo; Baluchistan: Quetta.

Lycæna bracteata, Butler, described from Kandahar seems to me inseparable from this form.

715. **Lycæna omphisa** (Pl. XIX, fig. 131), *Moore, P. Z. S.* 1874, p. 573, pl. 66, fig. 2 ♂; *de N. Butt. Ind.* iii, 1890, p. 84.
Lycæna metallica, pt., *Felder, Novara Reise, Lep.* ii, 1865, p. 283, pl. 35, fig. 9 (*nec* figs. 7 & 8).

♂. *Upperside*: dark brown. Fore and hind wings: overlaid from base outwards for some distance with purplish blue, clear dark blue or shining metallic green. The extent of this colour very variable; in some specimens, on the fore wing it spreads irregularly outwards chiefly along the costa and on the hind wing in the middle to the disc; in others, it covers the basal three-fourths of the wings, leaving a well-defined broad terminal margin of the ground-colour on the fore wing, and on the hind wing, broad costal, terminal and dorsal margins; cilia conspicuously white. *Underside*, fore wing: clear, slightly brownish grey, paler along the costal and terminal margins; a transverse, slightly lunular discocellular spot and a transverse series of six small discal spots black, all with slender white edgings, the discal series placed in a slight curve, the posterior three spots *en échelon*; no terminal markings except an anticiliary dark line. Hind wing: metallic green; in many specimens faint traces of one or two subbasal spots, entirely absent in others; a discocellular spot and a curved, transverse, discal series of from three to five spots, white; terminal markings, with the exception of a slender anticiliary dark line, absent, as on the fore wing. Antennæ, head, thorax and abdomen brownish black, the shafts of the antennæ ringed with white, the head, thorax and abdomen with some bluish pubescence; beneath: the palpi, thorax and abdomen white, the palpi fringed anteriorly with stiff black hairs.—♀. *Upperside*: uniform brown. Fore and hind wings: with slender, black, anticiliary lines and conspicuous snow-white cilia. Many specimens have some slight irroration of blue scales at the bases of the wings. *Underside*: similar to that of the ♂, the black spots on the fore and the white spots on the hind wing generally larger, and on the latter wing more clearly defined.

Exp. ♂ ♀ 26–33 mm. (1–1·30″).

Hab. N.W. Himalayas: Chitral, Lahoul, Ladakh.

716. **Lycæna galathea**, *Blanchard in Jacq. Voy. Ind.* iv, 1844, p. 21, pl. 1, figs. 5, 6, ♂; *Moore* (Polyommatus), *P. Z. S.* 1874, p. 271; *id. Sci. Res. Second Yarkand Mission, Lep.* 1879, p. 6.

Lycæna metallica, *Felder, Novara Reise, Lep.* ii, 1865, p. 283, pl. 3, figs. 7, 8 (*nec* fig. 9).

Polyommatus nycula, *Moore, P. Z. S.* 1865, p. 503, pl. 31, fig. 3 ♂.

♂. *Upperside*: dark violet, with in certain lights a beautiful shining blue gloss. Fore and hind wings: veins black; terminal margins and costal margin of the hind wing narrowly black. In some specimens this edging is on the terminal margins reduced to a slender but well-marked anticiliary line. *Underside*, fore wing: slightly brownish grey, paler towards the apex and along the termen; a short, transverse, lunular, dusky black line on the discocellulars, followed by a transverse, curved, discal series of six similarly coloured spots, prominently encircled with sullied white. In most specimens these discal spots are followed by a posterior postdiscal row of large subquadrate diffuse markings of dusky brown. Hind wing: pale metallic green, of a tint somewhat paler than in *L. omphisa*, Moore; a discocellular spot followed by a medially, outwardly angulated discal series of seven spots, white; in many specimens one or more of these spots absent.

Cilia of both fore and hind wings basally fuscous, outwardly white. Antennæ black, the shafts ringed with white; head, thorax and abdomen dark brown, in fresh specimens clothed with purplish-blue pubescence; beneath: palpi, thorax and abdomen whitish.—♀. *Upperside*: brown. Fore and hind wings: subterminal transverse series of large, somewhat quadrate ochraceous-red spots, on the fore wing generally four posited in interspaces 1 *a*, 1, 2 and 3; on the hind wing seven, the series complete; on both fore and hind wings the posterior two spots of the series are geminate. *Underside*: much as in the ♂, but the ground-colour of both fore and hind wings darker. In many specimens the apex and upper portion of the termen of the fore wing are suffused prominently with pale metallic green, and the posterior, postdiscal, large dusky brown markings practically absent. Cilia of both fore and hind wings and the antennæ as in the ♂; head, thorax and abdomen above brown; beneath: the palpi, thorax and abdomen white, as in the ♂.

Exp. ♂ ♀ 35–40 mm. (1·38–1·58").

Hab. N.W. Himalayas: Chitral, Pangi, Kashmir, Kulu, hills north of Simla.

I have followed de Nicéville in treating *L. nycula*, Moore, as a variety of *L. galathea*, but with considerable doubt. Specimens of *L. nycula*, Moore, in the British Museum, so named by Dr. Butler, differ from typical *galathea* as follows:—♂. *Upperside*: ground-colour of a more bluish purple. *Underside*: posterior portion of the disc of the fore wing darker grey, almost fuscous; apex in all the specimens suffused with metallic green. Hind wing: ground-colour a much darker metallic green than in any specimen of *galathea* that I have seen, almost, in some specimens quite, as rich a metallic green as in *L. omphisa*, Moore. ♀. *Underside*: ground-colour darker metallic green than in the ♂ and much darker than in the ♀ of *L. galathea*, the metallic green in certain lights suffused with blue.

Exp. ♂ ♀ as in *L. galathea*.

Hab. Described originally from Kunawar.

717. **Lycæna orbitulus**, *Esper* (Papilio), *Schmett.* i (? 1800), pl. 112, fig. 4.

Race jaloka.

Polyommatus jaloka, *Moore, P. Z. S.* 1874, p. 573, pl. 66, fig. 3 ♂; *de N.* (Lycæna) *Butt. Ind.* iii, 1890, p. 86.
Polyommatus ellisi, *Marshall, J. A. S. B.* 1882, p. 41, pl. 4, fig. 4 ♂; *de N. Butt. Ind.* iii, 1890, p. 87.
Lycæna ? leela, *de N., J. A. S. B.* 1883, p. 66, pl. 1, figs. 3, 3 *a*, ♂ ♀; *id.* (Lycæna) *Butt. Ind.* iii, 1890, p. 87.

A variable form; some specimens are scarcely separable from *L. orbitulus*, Esper, of which it is undoubtedly a geographical race.

Race **jaloka**, Moore.—♂. *Upperside*: brown suffused with metallic blue or green to a varying extent from the bases of the wings outwards. Typically the blue or green occupies about the basal three-fourths of the wings, and leaves on the fore wing a broad edging to the costa and still broader edging to the termen of the ground-colour; on the hind wing it occupies a medial area from the base to the disc, and leaves a broad brown edging to the costa, termen and dorsum. Fore and hind wings: discocellular spots black encircled by pale edgings, followed on both wings by transverse discal series of pale bluish-white spots and anticiliary slender black lines. In some these spots are very prominent, in others barely indicated. *Underside*: brownish, turning to greyish white on the termen. Fore wing: a more or less obscure pale-bordered discocellular spot, followed by a transverse, slightly curved discal series of six black spots encircled with white. Hind wing: the brown basal area irrorated inwardly with metallic blue scales and sharply demarcated from the greyish-white terminal area which occupies about half the wing; discocellular spot large and prominently white, as is an angulated transverse discal series of large spots; these latter spots in many specimens somewhat obscure on the greyish-white ground-colour of the terminal half of the wing. Cilia of both fore and hind wings conspicuously white. Antennæ, head, thorax and abdomen brown; the shafts of the antennæ obscurely ringed with white, the thorax and abdomen with a little bluish pubescence in fresh specimens; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: brown, without any blue or green irroration. Fore and hind wings: markings much as in the ♂, the discal spots always somewhat more prominent. *Underside*: as in the ♂; the discal spots generally more prominent and followed in some specimens by two or three posterior, large, diffuse brown markings. Antennæ, head, thorax and abdomen similar to those of the ♂, but the latter two without any blue pubescence; beneath: as in the ♂.

Exp. 28–30 mm. (1·10–1·18").

Hab. N.W. Himalayas: Kashmir, Pangi, Ladakh.

Var. *ellisi*, Marshall, differs from typical *jaloka* as follows:—♂ ♀. *Upperside*: in the ♂ the suffusion of metallic bluish-green scales restricted to the immediate base of the fore wing, extended slightly more outwards on the hind wing, but never so far towards the termen as in *jaloka*; in both sexes the discal series of spots on both fore and hind wings very large and clearly defined, the discocellular spot prominently white, very rarely centred with dark brown. *Underside*: creamy-white, slightly brownish on the discal areas of both fore and hind wings, while the discal spots on both wings are entirely white, with no trace of dark centres, as on the fore wing of the typical race. Otherwise as in *jaloka*.

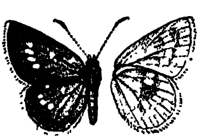

Fig. 81.
Lycæna orbitulus, race *jaloka*, var. *ellisi*.

Var. *leela*, de Nicéville, differs from typical *jaloka* as follows:—The irroration of metallic bluish-green scales on the upperside of the wings extended outwards from the base almost but not quite so far as in *jaloka*; the spots of the transverse discal series on both fore and hind wings as in *jaloka*, but each obscurely centred with blackish in most specimens. *Underside*: greyish white, discs of wings brown, bases irrorated somewhat densely with metallic green scales, paler than in the typical race. Fore wing: with a very indistinct irregular subterminal series of dark spots in addition to the discocellular and discal spots, which are similar to those in *jaloka*. Hind wing: according to de Nicéville has, in addition to the discocellular and discal markings, "a marginal double series of coalescing white lunules." I have not, however, seen any specimen so marked.

718. **Lycæna hylas**, *Wiener Verzeichniss* (Papilio), 1776, p. 185; *Kirby*, *Cat. Di. Lep.* 1871, p. 360; *de N. Butt. Ind.* iii, 1890, p. 84.
Papilio hylus, *Fabr. Mant. Ins.* ii, 1787, p. 75; *Butler* (Scolitantides), *Cat. Fabr. Lepidopt. Brit. Mus.* 1869, p. 167.
Papilio baton, *Bergstr. Nomencl.* ii, 1779, p. 18, & iii, pl. 60, figs. 6–8; *Elwes* (Lycæna), *P. Z. S.* 1881, p. 889; *Lang* (Lycæna), *Butt. Eur.* 1884, p. 109, pl. 24, fig. 2.
Polyommatus vicrama, *Moore*, *P. Z. S.* 1865, p. 505, pl. 31, fig. 6 ♀.
Scolitantides cashmirensis, *Moore*, *P. Z. S.* 1874, p. 272.

♂. *Upperside*: greyish blue. Fore and hind wings: with or without a black discocellular transverse lunule. Fore wing: terminal margin narrowly and evenly dusky brown or pale greyish blue, with obscure white lunules and an anticiliary black line (*cashmirensis*, Moore). Hind wing: terminal margin as in the ♂ or (var. *cashmirensis*) with a subterminal series of obscure white spots that are centred prominently with black, and an anticiliary black line as on the fore wing. Cilia of fore and hind wings snow-white conspicuously spotted with black at the ends of the veins, these latter black or concolorous with the ground-colour. *Underside*: slightly bluish or greyish cream-colour, with the bases of the wings irrorated with bluish scales and the following black spots and markings:—Fore wing: a spot in cell; a transverse lunular spot on the discocellulars; a transverse, very strongly bisinuate discal series of seven, sometimes eight, spots; a transverse postdiscal series that anteriorly curves slightly inwards of six spots, followed by a very indistinct, maculated, transverse, very narrow band and a clearly defined slender anticiliary line. Hind wing: a curved subbasal transverse series of four spots; a discocellular lunule, a spot above it near costa, and two spots in a straight line below it; a transverse discal curve of four spots beyond apex of cell; a strongly curved, transverse, postdiscal series of eight lunules, one in each interspace, those in interspaces 1 to 5 edged outwardly with ochraceous and followed by a subterminal series of black spots; lastly, a slender anticiliary black line as on the fore wing. Cilia as on the upperside. In some specimens the black discal spots on both fore and hind wings are encircled tolerably distinctly with white. Antennæ brown, the shafts ringed with white, head and thorax anteriorly snow-white, the thorax and abdomen above greyish blue; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: purplish brown, with more or less of an irroration of bluish-grey scales at the bases of the wings; the markings somewhat as in the ♂, but in var. *cashmirensis* the white subterminal lunules on the fore and the black subterminal spots on the hind wing are, in all specimens that I have seen, very obscure. The underside, antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 28–31 mm. (1·10–1·24″).

Hab. N.W. Himalayas: Kashmir, Kunawar; Baltistan; Baluchistan; westwards and northwards to Afghanistan, Central Asia, Russia, Southern and Central Europe. Within our limits it occurs at elevations of from 6000 to 14,000 feet.

719. **Lycæna pheretes,** *Hübner* (Papilio), *Eur. Schmett.* i, 1805, p. 45.

Race lehana (Pl. XIX, figs. 132, 133, ♂ ♀).

Polyommatus lehanus, *Moore, A. M. N. H.* (5) i, 1878, p. 230; *id. Sci. Res. Second Yark. Miss., Lep.* 1879, p. 6, pl. 1, fig. 6 ♂; *de N.* (Lycæna) *Butt. Ind.* iii, 1890, p. 81.

Race asiatica (Pl. XIX, fig. 134).

Lycæna pheretes, *Hubner, var.* asiatica, *Elwes, P. Z. S.* 1882, p. 402; *id. Trans. Ent. Soc.* 1888, p. 382; *de N. Butt. Ind.* iii, 1890, p. 81.

Race **lehana,** Moore.—♂ ♀. Eyes smooth. ♂. *Upperside*: purplish blue, dark blue at the bases of the wings. Fore and hind wings with somewhat obscure, slender, black, anticiliary lines, followed by very full, snow-white cilia. *Underside*: grey, pale plumbeous brown on the discs of the wings, the bases of both fore and hind wings irrorated with bluish-green scales. Fore wing: a narrow transverse black lunule on the discocellulars and a transverse curved discal series of five white spots, each spot centred with black. Hind wing: a streak in the cell, a spot above it near the costa and a discal series of five spots, of which the posterior four are in a very oblique line directed outwards, and the upper or fifth is much larger, placed much further inwards above the apex of the cell. In the type and a few others the discal spots are seven or eight in number, and smaller than in the majority of specimens I have seen. Antennæ dark brown, the shafts as usual ringed with white; head, thorax and abdomen clothed with bluish hairs; beneath: the palpi fringed with black hairs, thorax and abdomen white.—♀. Similar to the ♂, but on the upperside the ground-colour is rich brown, the bases of the wings only blue. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂, but the latter three brown, not clothed with bluish hairs.

Exp. ♂ ♀ 28–30 mm. (1·10–1·18″).
Hab. Western Himalayas: Ladakh, Kashmir, at from 8000 to 12,000 feet.

Race **asiatica,** Elwes.—♂ ♀. Eyes smooth. Fore wing much more pointed at apex, termen straighter, wing altogether proportionately shorter than in *pheretes*, race *lehana*. Other differences are as follows:—♂. *Upperside*: a rich metallic dark blue, quite different from the purplish blue of the parent form or of race *lehana*. *Underside*: ground-colour and markings similar to those of *lehana*, but on the fore wing the discal spots are generally entirely absent or reduced to one or two, while the hind wing is irrorated with metallic greenish-blue scales for two-thirds of its length from base. Otherwise similar.—♀. *Upperside*: much as in race *lehana*, but the underside with the obsolescence of the markings on the fore wing and the irroration of metallic greenish-blue scales on the hind wing as in its own ♂.
Exp. ♂ ♀ 25–27 mm. (0·98–1·04″).
Hab. Sikhim: the Chumbi Valley, at from 12,000 to 15,000 feet.

Genus NEOLYCÆNA.

Neolycæna, *de Nicéville, Butt. Ind.* iii, 1890, p. 64.

Type, *N. sinensis*, Alphéraky, from Western China.
Range. Western China, Turkestan, Baluchistan.

♂ ♀. Fore wing: costa very slightly arched; apex more or less rounded, not acute; termen slightly convex; tornus blunt; dorsum sinuate, slightly convex in the middle; cell short, less than half length of wing; all the veins distinct, wide apart from one another; vein 3 from well before lower apex of cell, vein 4 from apex; vein 5 at base midway between bases of 4 and 6; 6 and 7 from upper apex of cell, veins 8 and 9 absent, 10 and 11 from apical half of subcostal, vein 12 terminates on costa nearly opposite upper apex of cell, running nearly parallel with vein 11 in its apical half. Hind wing: ample, costa arched; apex rounded but well marked; termen convex; tornus rounded; dorsum slightly arched; cell very short; the veins as in the fore wing, well separated; vein 3 from well before, 4 from lower apex of cell; middle discocellular slightly shorter than lower: vein 7 from apical half of subcostal; vein 8 strongly curved in its basal half, terminates at apex of wing; precostal area broad.

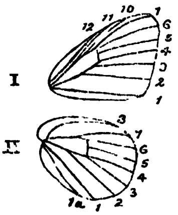

Fig. 82.
Neolycæna, venation.

A single form comes just within our limits in Northern Baluchistan.

720. **Neolycæna sinensis**, *Alphéraky* (Lycæna), *Hor. Soc. Ent. Ross.* xvi, 1881, p. 383, pl. 14, fig. 7; *de N. Butt. Ind.* iii, 1890, p. 65, pl. 26, fig. 166.

"*Male* and *female. Upperside*: both wings fuscous brown; cilia interrupted with white. *Underside*: both wings greyish brown with a very slender marginal line. *Fore wing*: with an interrupted exterior series of markings composed of irregular white short streaks. *Hind wing*: with the disc irregularly marked with white lunules and short streaks and with a series of submarginal dots, interiorly margined with white.

"*Male* and *female. Upperside*: both wings blackish brown; cilia of the same colour, but spotted with white at the ends of the veins, this only very narrowly so on the fore and more broadly on the hind wing; the cilia is similar on the underside. *Underside*: both wings of a greyish-brown tint, very much lighter (than above). An extremely fine bordering line runs along the exterior margin of both wings, sometimes very indistinct in the fore wing. Fore wing: traversed at nearly three millimetres from the outer margin by an interrupted series of white, irregular, small streaks (lunules), with one whitish lunule placed above the first nervure and placed more towards the interior of the wing. This last (lunule) disappears entirely in some specimens. A small streak, or rather a small whitish dot, is found generally in the discoidal cell. Hind wing: faintly dusted with white scales near its first half (the base of the wing). The disc is sprinkled with more or less large lunules, concave towards the base, and generally shaded with blackish interiorly, and also with some white streaks not far from the base; but the whole is so irregular and so different in each individual specimen that a figure alone could give a sufficiently exact idea of it. All along the exterior margin of both wings there is a submarginal series of black dots, which are round and bordered with white on their interior side. These dots are very distinct on the hind wing, but on the fore wing they are more or less obliterated, and sometimes they completely disappear.

"The species appears to be thoroughly isolated in the genus *Lycæna* and must take its place in the small group formed by some very heterogeneous species: *L. rhymnus*, Eversmann, *L. tengstrœmi*, Erschoff, and *L. anthracias*, Cristoph." (*Alphéraky*, as translated by de Nicéville.)

Exp. ♂ "1·2 inches."

Hab. Western China: Kuldja; Baluchistan.

As noted by de Nicéville, the only record of the occurrence of this form within our limits is a single specimen taken at Gunduk in Baluchistan by the late Capt. Watson.

Genus ZIZERA.

Zizera, *Moore, Lep. Ceyl.* i, 1881, p. 78; *de N Butt. Ind.* iii, 1890, p. 110.

Type, *Z. alsus*, "Wiener Verzeichniss." European.

Range. Europe; Northern and Southern Africa; Asia.

♂ ♀. Fore wing: costa widely arched; apex well-marked but blunt; termen convex, short; tornus obtusely angulate; dorsum slightly sinuate, comparatively long, about three-fourths the length of the costa; cell a little less than half length of wing; upper discocellular in line with and forming part of subcostal vein, middle and lower discocellulars subequal, obsolescent; vein 3 from well before, 4 from lower apex of cell, vein 6 from upper apex of cell, well separated from 7 at base, vein 8 absent, 9 and 10 from apical half of subcostal, vein 11 anastomosed with vein 12. Hind wing: oval, veins 3 and 4 from lower apex of cell. Antennæ slightly less than half length of fore wing, club elongate, concave on the underside; palpi subporrect, thickly fringed anteriorly with stiff hairs, third joint long, about three-fourths length of second joint; eyes naked; body and legs robust.

This genus is allied to *Lycæna*, and the forms arranged under it very closely resemble the forms of *Lycæna*, but vein 11 of the fore wing is always anastomosed with vein 12.

Key to the forms of Zizera.

A. Underside fore wing: a black spot in middle of cell.
  a. Exp. ♂ ♀ 26–29 mm. Upperside: ♂ light blue, silvery in certain lights; ♀ brownish black, sometimes purplish at bases of wings. *Z. maha*, p. 355.
  b. Exp. ♂ ♀ 22–24 mm. Upperside: ♂ violet-blue; ♀ pale satiny brown .... *Z. lysimon*, p. 357
B. Underside fore wing: no black spot in middle of cell.
  a. Underside hind wing: spot of discal series in interspace 6 in same straight line as spots in interspaces 5 and 7 .... *Z. gaika*, p. 359.
  b. Underside hind wing: spot of discal series in interspace 6 vertically below spot in interspace 7, never in line with spots in interspaces 5 and 7 .... *Z. otis*, p. 360.

721. **Zizera maha** (Pl. XIX, figs. 136, 137), *Kollar* (Lycæna) *in Hugel's Kaschmir*, iv, 1848, p. 422; *Moore, P. Z. S.* 1882, p. 245; *de N. Butt. Ind.* iii, 1890, p. 112, pl. 26, fig. 172; *Butler, P. Z. S.* 1900, p. 106.

Polyommatus chandala, *Moore, P. Z. S.* 1865, p. 504, pl. 31, fig. 5 ♂; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 114.

Lycæna diluta, *Felder, Novara Reise*, ii, 1865, p. 280, pl. 35, figs. 12, 13, ♂; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 114.

Lycæna squalida, *Butler, Trans. Ent. Soc.* 1879, p. 4; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 115.
Zizera ossa, *Swinhoe, P. Z. S.* 1885, p. 132, pl. 9, figs. 11, 12, ♂ ♀.

Wet-season brood.—♂. *Upperside*: silvery light blue with a satiny sheen in certain lights. Fore wing: the apical half of the costa narrowly and the terminal margin for varying widths fuscous black, bounded outwardly on the latter by an obscure anticiliary black line. Hind wing: the costa broadly, the termen somewhat more narrowly fuscous black as in the fore wing, with the width of this dark edging similarly variable; in addition there is a very diffuse and ill-defined subterminal series of spots darker than the fuscous margin. *Underside*: brownish grey. Fore wing: a spot in cell, a transverse lunule on the discocellulars, and a transverse anteriorly inwardly curved series of eight discal spots, black; the transverse lunule and each spot encircled with a narrow white edging; the posterior two spots of the discal series geminate. Beyond these are a postdiscal and a subterminal series of short transverse dusky black spots followed by an anticiliary black line; the ground-colour between the discal and postdiscal series and between the latter and the subterminal series of spots posteriorly paler than on the rest of the wing. Hind wing: a transverse, subbasal, slightly sinuate line of four spots, a short, slender, lunular line on the discocellulars, and a very strongly curved discal series of eight small spots, black; the lunule and each spot encircled with a narrow edging of white; the posterior two spots of the discal series geminate as on the fore wing; beyond these as on the fore wing there is a double line of dusky spots, only more lunular, with between them and between the discal and postdiscal series the ground-colour in the same way followed by slightly paler; an anticiliary fine black line. Cilia of both fore and hind wings whitey brown, darker anteriorly on the fore wing. Antennæ, head, thorax and abdomen dark brown, shafts of the antennæ ringed with white; in fresh specimens the thorax and abdomen with a little light blue pubescence; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: brownish black; the basal halves of the wings slightly suffused with light blue, anticiliary black lines on both fore and hind wings, and on the latter wing an obscure subterminal series of spots as in the ♂. *Underside*: similar, only the ground-colour darker, the markings larger and more clearly defined. Antennæ, head, thorax and abdomen as in the ♂, but with no blue pubescence on the thorax and abdomen on the upperside.

Dry-season brood.—♂. *Upperside*: pale bluish-grey with, in some specimens, a pinkish undertone. Fore wing: as in the wet-season brood, but the black terminal edging much reduced in width in some specimens to a transverse, somewhat diffuse, very narrow band that borders the anticiliary black line on the inner side, in others to a much broader similar band that coalesces with the anticiliary black line and occupies about the outer sixth of the wing. This edging along the termen is sometimes even, sometimes it widens from a slender anticiliary at and above the tornus to a broad black patch at the apex of the wing. Hind wing: the terminal black edging much narrower proportionately than in wet-season specimens, most often reduced to a slender black anticiliary line with a series of black spots on the inner side, bordering and sometimes coalescing with the line. *Underside*: as in the wet-season brood but the ground-colour paler, in some specimens much paler, the markings on both fore and hind wings similar, with frequently the terminal markings obsolescent, sometimes entirely absent or only indicated anteriorly on each wing. Cilia whitish. Antennæ, head, thorax, and abdomen as in the wet-season specimens.—♀. Similar to the ♀ of the wet-season brood, but more like the ♂, with the light silvery-blue suffusion very irregular, but generally extended much further outwards from the base. In a ♀ from Poona, now before me, the fore wing on the upperside has the basal half silvery blue, the outer half black; on the hind wing, however, the blue colour extends almost to the termen which is only narrowly edged with diffuse dusky black. *Underside*: as in the ♂, the ground-colour slightly darker. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 28–32 mm. (1·10–1·23").

Hab. Throughout peninsular India from the outer ranges of the Himalayas to Travancore; Assam; Upper and Lower Burma. Mr. de Nicéville does not record it from Burma, but I got it at Pegu and also in the Ruby Mines district in Upper Burma.

722. **Zizera lysimon,** *Hübner* (Papilio), *Eur. Schmett.* i, 1798, pl. 105, figs. 534, 535; *Lang* (Lycæna), *Butt. Eur.* 1884, p. 111, pl. 24, fig. 3 ♂ ♀; *Trimen* (Lycæna), *South African Butt.* ii, 1887, p. 45; *de N. Butt. Ind.* iii, 1890, p. 116, pl. 26, fig. 173 ♀; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 373.

Polyommatus karsandra, *Moore, P. Z. S.* 1865, p. 505, pl. 31, fig. 7 ♀; *id.* (Zizera) *Lep. Ceyl.* i, 1881, p. 78, pl. 35, figs. 6, 6*a* ♂; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 117.

Zizera mora, *Swinhoe, P. Z. S.* 1884, p. 506, pl. 47, fig. 2; *de N. Butt. Ind.* iii, 1890, p. 118.

♂. *Upperside*: brown with a more or less dense suffusion of violet. In some specimens the violet colour is more clearly apparent in certain lights than in others and extends further outwards, but to lesser degree in wet-season specimens than in those taken in the dry weather or in exceptionally dry tracts of country. Fore wing: terminal margin broadly dark brown. Hind wing: costal and terminal margins broadly dark brown. In a few specimens a subterminal series of round black spots is more or less clearly apparent on the hind wing. *Underside*: grey. Fore wing: a spot in middle of cell, a short, transverse, lunular line on the discocellulars, and a transverse, anteriorly strongly curved, discal series of eight spots jet-black, the discocellular lunule and the spots each encircled with white; the posterior two spots of the discal series geminate, the three spots above these *en échelon* placed obliquely; beyond these are an inner and an outer transverse subterminal series of elongate dusky spots or short lines and an anticiliary black line. Hind wing: a transverse, curved, subbasal line of four well-separated spots, an abbreviated line on the discocellulars and a transverse highly curved discal series of eight spots, black, followed by an inner series of dusky lunules, an outer subterminal series of round dusky spots and an anticiliary slender black line. Cilia of both fore and hind wings grey, paler outwardly. Antennæ black, shafts ringed with white; head, thorax and abdomen brownish; beneath: palpi, thorax and abdomen sullied white.—♀. *Upperside*: brown with, in a few specimens, the bases of both wings with traces of a violet irroration. In the majority of specimens, however, only the dorsal or posterior half of the hind wing is flushed with violet. Fore wing: the discocellulars with a transverse dusky short line. Fore and hind wings otherwise immaculate, with anticiliary dusky lines. *Underside*: ground-colour darker, in some pale brown; markings on both fore and hind wings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂, but on the underside the palpi, thorax and abdomen, in some specimens, purer white.

Exp. ♂ ♀ 18–24 mm. (0·69–0·96″).

Hab. Southern Europe; Africa; Central and Western Asia. Within our limits, peninsular India south of the outer Himalayan Range; Ceylon; Assam; Burma; Tenasserim; Nicobars; extending through the Malayan Subregion to Australia. It has been recorded also from Madagascar and the Mauritius.

There seems to be some seasonal variation in this form, but it is not so obvious as in *Z. maha*. Specimens taken in the wet season have in the ♂ broader terminal brown margins to the wings, and in the ♀ a greater extent of violet suffusion on the upperside. On the underside the ground-colour is of a deeper shade in both sexes than in dry-season specimens.

Larva. "The larva, which feeds on a small vetch (*Zornia diphylla*), is of the usual form but narrow, and is not attended by ants; it is covered with minute light coloured hairs. Colour grass-green, with a lighter marginal line." (*Davidson, Bell & Aitken.*)

Pupa. "Of the usual form, narrow, green with a slightly darker line dorsally and with brown edges to the wing-covers." (*Davidson, Bell & Aitken.*)

Var. *karsandra*, Moore, is a pale form of *lysimon*, and was described originally from a ♀ specimen. *Zizera mora*, Swinhoe, is an aberration in which the discal spots are lengthened into streaks. Mr. de Nicéville remarks, such aberrations are of frequent occurrence among the *Lycænidæ*.

723. **Zizera gaika**, *Trimen* (Lycæna), *Trans. Ent. Soc.* (3) i, 1862, p. 403; *de N. Butt. Ind.* iii, 1890, p. 118.
Lycæna pygmea, *Snellen, Tijd. voor Ent.* xix, 1876, p. 163, pl. 7, fig. 3; *Moore* (Zizera), *Lep. Ceyl.* i, 1881, p. 79, pl. 25, figs. 5, 5 *a*, ♂.

♂. *Upperside*: dull violet-blue, which changes to a brighter tint of violet in certain lights. Fore wing: the costa very narrowly, the termen much more broadly dull brown; this edging to the termen in most specimens decreases in width from apex to tornus, and is outwardly followed by an anticiliary darker brown line. Cilia brownish anteriorly, posteriorly brownish at the base with the apical portions white. Hind wing: the ground-colour brighter than on the fore wing, the costal and terminal margins much more narrowly edged with brown, which edging is merged in the anticiliary dark brown line. Cilia: brown along their basal halves, white apically. *Underside*: grey. Fore wing: a dusky brown lunular line on the discocellulars; two subcostal spots above the cell, one on either side of the discocellular lunule; a very strongly curved discal series of five spots, of which the posterior three are somewhat lunular in shape and placed obliquely *en échelon*, the next above these hook-shaped, the anterior spot round; both the subcostal spots and the spots of the discal series are black, each narrowly encircled with white; beyond these are inner and outer subterminal dusky lines, which anteriorly are continuous, posteriorly somewhat broken and macular, followed by a very conspicuous jet-black anticiliary slender line. Cilia greyish white, traversed by a medial transverse blackish-brown line. Hind wing: with the following small white-encircled black spots:—a subbasal transverse series of three, followed by a highly curved series of eight spots, that curve across the disc of the wing to the costa and along the latter towards the base; discocellulars with a dusky short lunular line as on the fore wing; terminal markings and cilia similar, but the outer and broader subterminal line more broken and macular than on the fore wing. Antennæ black, the shafts ringed with white; head, thorax and abdomen dark brown, with a little violet pubescence on the head and thorax; beneath: palpi, thorax and abdomen greyish white.—♀. *Upperside*: glossy brown, without any violet tint whatever; the anticiliary darker brown lines on both fore and hind wings well marked. *Underside*: very similar to that of the ♂, the ground-colour a shade darker, the markings slightly larger and more prominent. Antennæ, head, thorax and abdomen as in the ♂, but the latter three without a trace of violet or blue on the upperside.

Exp. ♂ ♀ 20–23 mm. (0·8–0·95").

Hab. Within our limits spread through Peninsular India; Ceylon; Assam; Burma; Tenasserim; the Andamans; extending in the Ethiopian Region to Aden and South Africa, and in the Malayan Subregion to Sumatra and Java.

724. **Zizera otis**, *Fabr.* (Papilio) *Mant. Ins.* ii, 1787, p. 73; *Butler, A. M. N. H.* (5) xviii, 1886, p. 186; *de N. Butt. Ind.* iii, 1890, p. 119, pl. 26, fig. 175 ♂.
Polyommatus sangra, *Moore, P. Z. S.* 1865, p. 772, pl. 41, fig. 8 ♂; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 120.
Lycæna indica, *Murray, Trans. Ent. Soc.* 1874, p. 525, pl. 10, figs. 2, 3, ♂ ♀; *Moore* (Zizera) *Lep. Ceyl.* i, 1881, p. 79, pl. 35, figs. 7, 7*a*, ♂; *de N.* (Zizera) *Butt. Ind.* iii, 1890, p. 121.

♂. *Upperside*: pale violet-blue, with a silvery sheen in certain lights. Fore wing: a broad brown edging along the termen, which covers in some specimens quite the outer fourth of the wing, while in others is much narrower. In all specimens it is broadest at apex and is bounded by an anticiliary darker line, beyond which the cilia are brownish at base and white outwardly. Hind wing: anterior or costal third to half and apex brown; a slender black anticiliary line, beyond which the cilia are as in the fore wing. *Underside*: brownish grey. Fore wing: a short, transverse, dusky lunule on the discocellulars and a transverse, anteriorly curved, discal series of seven minute black spots, all the spots more or less rounded, the posterior two geminate, the discocellular lunule and each discal spot conspicuously encircled with white; the terminal markings beyond the above consist of an inner and an outer transverse subterminal series of dusky spots, each spot edged on the inner side very obscurely with dusky white, the inner line of spots lunular, the outer with the spots more or less rounded. Cilia dusky. Hind wing: a transverse, curved, subbasal series of four spots and an irregular transverse discal series of nine small spots black, each spot encircled narrowly with white. Of the discal spots the posterior four are placed in an outwardly oblique, slightly curved line, the middle two spots geminate; the three spots above these are placed in an oblique transverse line further outwards; lastly, the anterior two spots are posited one over the other and shifted well inwards, just above the apex of the cell; discocellular lunule and terminal markings as on the fore wing, but the inner subterminal lunular line in the latter broader and more prominent. Cilia dusky. Antennæ black, shafts ringed with white; head, thorax and abdomen brown, with a little blue scaling; beneath: white.—♀. *Upperside*: brown, with a more or less distinct suffusion of violet-blue at the bases of the wings, on the hind wing continued obscurely along the dorsum; both fore

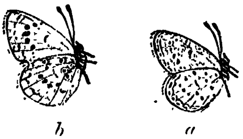

Fig. 83.
a. Zizera gaika, underside.
b. Zizera otis, underside.

and hind wings with slender anticiliary lines, darker than the ground-colour. *Underside*: ground-colour slightly darker than in the ♂, markings precisely similar. Antennæ, head, thorax and abdomen as in the ♂, but the thorax and abdomen above without any blue scaling.

Exp. ♂ ♀ 22–27 mm. (0·78–1·08″).

Hab. Punjab; Kumaon; Sikhim: Bengal; Orissa; Central, Western and Southern India; Ceylon; Assam; Burma; Tenasserim; extending to the Malayan Subregion as far as Java, and into China.

Z. sangra, Moore, and *Z. decreta*, Butler, are slight varieties that differ so little from the typical form as to make it impossible to discriminate one from the other in any large series of specimens from different localities. *Z. indica*, Murray, is more easily separable by the great size of the discal black spots on the underside of the fore wing, but specimens intermediate between typical *otis* and typical *indica* are by no means uncommon throughout the range of the form.

Genus **AZANUS**.

Azanus, *Moore, Lep. Ceyl.* i, 1881, p. 79; *de N. Butt. Ind.* iii, 1890, p. 122.

Type, *A. ubaldus*, Cramer, from Ceylon.

Range. Arabia, India, Ceylon, Assam, Burma.

♂ ♀. Fore wing: costa very slightly arched; apex subacute; termen convex; tornus obtuse; dorsum straight; cell about half length of wing; upper discocellular in line with subcostal nervure, middle and lower subequal and nearly vertical; vein 3 from well before, vein 4 from lower apex of cell, vein 6 from upper apex of cell, vein 7 from a little before; vein 8 absent, 9 out of 7, 10 free, 11 anastomosed with 12. Hind wing: costa arched; apex broadly rounded; termen convex; tornus well marked, angular; dorsum sinuate, strongly convex in the middle, concave just before tornal angle; cell short, less than half length of wing, all the veins well separate from one another; vein 3 from before lower apex of cell. Antennæ a little longer than half length of fore wing, club large and abrupt; palpi more or less porrect, second joint densely clothed with long hairs anteriorly, third short, blunt at apex; eyes hairy; body moderately robust.—♂. In two of the forms on the upperside of the fore wing, specialized hair-like scales on the disc extend upwards into the cell and beyond it into bases of interspaces 4 and 5.

Three forms are recorded from within our limits, of which one seems to me doubtfully distinct from the typical form. In the absence of evidence from the larva and pupa (unknown of any of the forms), and even of a good series of dated specimens, I have followed de Nicéville and kept *A. uranus*, Butler, distinct from *A. ubaldus*, Cramer. I think, however, that the former will probably prove to be the dry-season brood of the latter.

Key to the forms of Azanus.

A. Underside fore wing, ♂ ♀: a black spot in middle of cell .... *A. jesous*, p. 363.
B. Underside fore wing, ♂ ♀: no black spot in middle of cell.
  a. Underside: greyish brown; hind wing: a conspicuous, transverse, subbasal series of four black spots .... *A. ubaldus*, p. 362.
  b. Underside: greyish white; hind wing: without, or with only a slight trace of subbasal series of black spots...................... *A. uranus*, p. 363.

725. **Azanus ubaldus** (Pl. XIX, fig. 138), *Cramer* (Papilio), *Pap. Exot.* iv, 1782, p. 209, pl. 390, figs. L, M, ♂; *Moore, P. Z. S.* 1882, p. 245; *de N. Butt. Ind.* iii, 1890, p. 123.
Lycæna zena, *Moore, P. Z. S.* 1865, p. 505, pl. 31, fig. 9 ♀; *Butler* (Azanus), *P. Z. S.* 1884, p. 483.

♂. *Upperside*: brownish purple, dark blue at base of wings. Fore wing: costa very narrowly along its apical half, termen evenly and a little more broadly from apex to tornus, edged with brown; the area on the disc, in the cell and beyond it is covered with hair-like specialized scales and is distinctly darker. Hind wing: similar, the brown edging to the costa much broader; posteriorly in the tornal area there is a dark spot in interspace 1 and another more clearly-defined similar spot in interspace 2, both spots merged more or less into the terminal brown edging. Cilia of both fore and hind wings white, with their basal halves evenly dark brown. *Underside*: greyish brown. Fore wing: two short white lines, one each side of the discocellulars; a minute black subcostal dot above apex of cell, another similar dot a little beyond it; two parallel, obliquely-placed, transverse, upper discal white lines, followed by an inner and an outer obliquely-placed, irregular, broken, subterminal line also white, the inner one somewhat lunular, and an anticiliary dark line; the posterior third from base of the wing uniform, somewhat paler than the rest. Hind wing: the following black white-encircled spots conspicuous: 4 subbasal spots in transverse order, a subcostal spot in middle of interspace 7, two minute geminate spots at the tornal angle, and a larger one in interspace 2; two transverse short white lines on either side of the discocellulars as on the fore wing; a transverse, curved, catenulated, discal band of white markings, followed by a postdiscal and subterminal series of white lunules and an anticiliary dark line edged inwardly with white. Antennæ dark brown, the shafts ringed with white; apex of club also white; head, thorax and abdomen dark brown, the thorax in fresh specimens with a little purplish-blue pubescence; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: rich silky brown. Fore and hind wings: suffused with purplish blue at base, and with anticiliary black lines. Hind wing: with two black spots at tornal area as in the ♂. *Underside*: as in the ♂, but the markings more regular, more evenly and neatly defined, and the white transverse lines on the fore wing carried to the dorsal margin. Cilia, antennæ, head, thorax and abdomen similar to those of the ♂, the thorax however, devoid of any bluish pubescence on the upperside.

Exp. ♂ ♀ 21–24 mm. (0·84–0·96″).

Hab. N.W. Himalayas; Baluchistan; the Punjab; Oudh; Bengal; Orissa; Central, Western and Southern India: Ceylon; Upper Burma: Tilin Yaw (*Watson*).

726. **Azanus uranus**, *Butler, P. Z. S.* 1886, p. 366, pl. 35, fig. 1 ♂; *de N. Butt. Ind.* iii, 1890, p. 124.

♂ ♀. Closely resembles *A. ubaldus*, Cramer. The ♂ on the upperside has the ground-colour much paler and the terminal edging on both fore and hind wings much narrower, reduced, in fact, to a conspicuous dark brown anticiliary line, while the two dark spots at the tornal area of the hind wing are more or less obsolescent. In the ♀ on the upperside the ground-colour is also much paler than in the ♀ of *ubaldus*, but the suffusion of purplish blue at the base of the wings in the solitary ♀ specimen that I have seen is spread slightly further outwards than it is in the ♀ of *ubaldus*. *Underside* ♂ ♀: ground-colour greyish white; character and disposition of the markings much as in *ubaldus*, but faint and not clearly defined, often many of them scarcely traceable; the transverse subbasal row of black spots on the hind wing either completely absent or barely visible. The black subcostal spot in interspace 7, though smaller than in *ubaldus*, seems to be always present, while the tornal black spots seem to be particularly large and prominent in both sexes.

Exp. ♂ ♀ 25–28 mm. (1·00–1·10″).

Hab. Baluchistan; the Punjab; Karachi; Oudh; Kumaon; Sikhim; Bengal; Central and Southern India.

727. **Azanus jesous**, *Guérin* (Polyommatus) *in Lef. Voy. Abyss.* vi, (1847), p. 383, pl. 11, figs. 3, 4; *Trimen* (Lycæna), *South Afr. Butt.* ii, 1887, p. 72.

Lycæna gamra, *Lederer, Verh. zool.-bot. Ges. Wien*, v, 1855, p. 189, pl. 1, fig. 3 ♂; *de N.* (Azanus) *Butt. Ind.* iii, 1890, p. 125.

Azanus crameri, *Moore, Lep. Ceyl.* i, 1881, p. 80, pl. 36, fig. 1.

♂. *Upperside*: a paler and much brighter purple than in *A. ubaldus*, the dark blue tint at the base of the wings more pronounced. Fore wing: without the clothing of specialized hair-like scales so conspicuous in *ubaldus*. Hind wing: with the dark tornal spots very obscure. Fore and hind wings: with only slender dark anticiliary lines, but no regular brown edging. *Underside*: dull pale grey. Fore wing: costal margin brown, a black white-encircled spot in cell, a dark chestnut-brown streak between vein 12 and subcostal vein; similarly-coloured but somewhat paler transverse bars cross the upper discal area of the wing as follows:—one on the discocellulars and three beyond, each bar edged internally and externally with white; below this two elongate brownish white-edged spots placed *en échelon*, and beyond a slender, unbroken, transverse, postdiscal brown line; a transverse subterminal series of black spots, each surrounded with white, and a slender anticiliary dark line. In most specimens there is also a dusky spot below the cell near the base of the wing. Hind wing: an outwardly oblique short streak from base of cell, a spot below it, a transverse subbasal series of four spots and a complete series of subterminal spots in interspaces 1, 2, 4, 5, 6 and 7, jet-black, each spot surrounded with white; the subterminal spot in interspace 3, a terminal small spot in interspace 7, an outwardly-oblique discal line of six elongate spots, the anterior spot shifted inwards out of line, and a transverse line beyond apex of cell, dark brown, each of these markings margined with white; on the terminal area there is an inner subterminal lunulated dark line on the inner side of the series of black spots and an anticiliary similar slender line. Cilia white, basal halves brown; on the fore wing interrupted also with brown at the apices of the veins. Antennæ, head, thorax and abdomen dark brown; shafts of the antennæ white-ringed, thorax with a little bluish pubescence; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: silky brown, bluish at the base of the wings. Fore wing: a large dark brown discocellular transverse spot and a small quadrate white patch beyond. Hind wing: some two or three obscure dark subterminal spots towards the tornus. In some specimens the series complete from apex to tornus, more obscure anteriorly than posteriorly. Fore and hind wings: both with slender dark anticiliary lines. *Underside*: ground-colour slightly paler, but the markings very similar to those in the ♂; the transverse brown bars beyond apex of cell on the fore wing longer, almost extended to the dorsal margin. Cilia, antennæ, thorax and abdomen much as in the ♂.

Exp. ♂ ♀ 24–26 mm. (0·93–1·02″).

Hab. Africa; Arabia; and within our limits: Baluchistan; the Punjab eastwards through Oudh to the Central Provinces; Central, Western and Southern India; Ceylon; Upper Burma: Myingan (*Watson*).

Genus **CHILADES.**

Chilades, *Moore, Lep. Ceyl.* i, 1881, p. 76; *de N. Butt. Ind.* iii, 1890, p. 88.

Type, *C. laius*, Cramer, from Ceylon and India.

Range. "South Africa, North and South Tropical Africa, extra-tropical North Africa, South-east Europe, Asia Minor, Persia and Aden, almost throughout India and Ceylon, but not in the Malay Peninsula as far as is known, reappearing, however, in Java, Samba, Sambawa and Australia" (*de Nicéville*). Occurs also in China.

Very closely allied to *Lycæna*, from which the two forms that are placed under it are kept separate, more for convenience and because of the character of the wing-markings on the underside and the peculiar range of the forms, than for the slight structural difference which is noted below.

♂ ♀. Venation of the wings and structure of the antennæ, palpi and legs as in *Lycæna*, with the exception that in the hind wing veins 3 and 4 are emitted typically from the lower apex of the cell, and not vein 3 from a little before, 4 from the apex of the cell as in *Lycæna*.

Key to the forms of Chilades.

a. Upperside: ♂ purplish blue; ♀ brown, with more or less of blue suffusion at base of wings. Underside hind wing: ♂ without an ochreous patch at tornal area, or ocelli sprinkled with metallic-green scales .... *C. laius*, p. 365.

b. Upperside: ♂ ♀ brown, not suffused with blue. Underside hind wing: ♂ ♀ with a more or less well-marked ochraceous patch at tornal area, and three black ocelli sprinkled outwardly with metallic-green scales .... *C. trochilus*, p. 367.

728. **Chilades laius** (Pl. XIX, fig. 135), *Cramer* (Papilio), *Pap. Exot.* iv, 1780, p. 62, pl. 319, figs. D, E; *Moore* (Polyommatus), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 21, pl. 12, figs. 1, 1 *a*, larva & pupa; *de N. Butt. Ind.* iii, 1890, p. 89, pl. 26, figs. 168, 169, ♂.
Chilades varunana, *Moore, Lep. Ceyl.* i, 1881, p. 77, pl. 35, fig. 3 ♂.
Polyommatus kandura, *Moore, P. Z. S.* 1865, p. 772, pl. 41, fig. 7 ♀; *Swinhoe* (Zizera), *Trans. Ent. Soc.* 1885, p. 341.

Wet-season brood.—♂. *Upperside*: bluish purple. Fore wing: base and basal half of costa flushed with pale blue; costa and termen edged by a slender dark brownish-black even line, beyond which along the termen the cilia are brown at base, white outwardly. Hind wing: costa somewhat broadly dusky black; a slender black conspicuous anticiliary line, beyond which the cilia are white traversed medially by a brown line; dorsum broadly pale brown, two subterminal pale-bordered black spots in interspace 1, and one similar spot in interspace 2, often obsolescent and barely indicated. *Underside*: grey. Fore wing: a transverse broad lunule on the discocellulars and a transverse discal series of six spots dark brown, the lunule and each of the discal spots edged with white; the posterior four spots of the discal series elongate and each obliquely placed, the anterior two round and curved inwards; a subterminal series of transverse elongate spots with an inner series of lunules dusky brown, both series edged inwardly and outwardly with white; finally, an anticiliary slender black line. Cilia white, medially traversed by a dark brown line. Hind wing: the following jet-black spots slenderly encircled with white:—a transverse subbasal series of four and a subcostal spot somewhat larger than the others in the middle of interspace 7; below the latter a catenulated line of slenderly white-edged dusky-brown spots, including the lunular spot on the discocellulars, crosses the wing, and beyond these opposite the apex of the cell are three similar discal spots, the middle one elongate; the terminal markings consist of an inner continuous subterminal series of dusky lunules, bordered inwardly and outwardly with white, an outer subterminal series of inwardly conical dusky-brown spots, and a slender anticiliary black line. The posterior two spots of the outer line of subterminal markings are also black. Cilia white. Antennæ black, the shafts obscurely ringed with white; head, thorax and abdomen brown, the head, thorax and base of the abdomen with a little blue scaling; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: dark brown. Fore and hind wings from their bases outwards to a varying extent shot with bright iridescent blue, this colour not extended on either wing to the costa, termen or dorsum. Hind wing: in addition a curved postdiscal series of whitish lunules very often obsolescent, in some specimens entirely wanting; followed by a subterminal series of black, narrowly white-encircled spots that are often obscure and in some specimens do not reach the apex. Anticiliary black lines and cilia as in the ♂. *Underside*: precisely similar to that of the ♂. Antennæ, head, thorax and abdomen as in the ♂.

Dry-season brood.—♂ ♀. Closely resemble specimens of the wet-season brood, but can always be distinguished by the somewhat paler ground-colour of the upperside, while on the underside both sexes bear a large nebulous brown patch on the hind wing posteriorly. Sometimes the ground-colour on the underside is much paler, almost white, especially in the ♀.

Exp. ♂ ♀ 28–32 mm. (1·10–1·26″).

Hab. Baluchistan; N.W. Himalayas, not ascending above 6000 or 7000 feet; N.W. Provinces eastwards to Bengal and Assam, southwards through Central, Western and Southern India to Ceylon; Burma; Tenasserim; Southern China.

This form is very constant and unmistakable in the markings of the underside. It seems to be also fairly constant in size, but some six or seven specimens sent to me by Major Stokes-Roberts, R.E., from the Nilgiris, are extraordinarily small (*Exp.* ♂ ♀ 18–20 mm.), though in ground-colour and markings, both on the upper and under sides, ♂ and ♀ are precisely similar to the corresponding sexes of the larger and typical form.

Larva. “Pale green at all stages, of the shade of the young leaves of the lime and pummeloe bushes on which it feeds. When full-grown it is about seven-sixteenths of an inch in length, onisciform as usual; the head black, smooth and shining, with a somewhat dark green dorsal line down the body, the whole surface but very slightly shagreened and covered with extremely fine and short downy hairs. The constriction between the segments slight. There are traces of two pale subdorsal lines, and there is a pale lateral line below the spiracles. The usual extensile organ on the twelfth segment short. This larva has no distinctive markings by which it can be easily recognized; it is altogether a very plainly coloured and marked insect. I have found it common in Calcutta during the rains, the ant which attends it betraying its presence. The latter has been identified by Dr. A. Forel as '*Camponotus rubripes*, Drury (*sylvaticus*, Fabr.), subspecies *compressus* *, Fabr." (*de Nicéville.*)

Pupa. "Green; of the usual Lycænid shape, with a dorsal and lateral series of somewhat obscure conjoined brownish spots on the upperside. Attached to the underside of the leaves of its food-plant in the usual manner." (*de Nicéville.*)

729. **Chilades trochilus,** *Freyer* (Lycæna), *Neuere Beitrage Schmett.* v, 1844, p. 98, pl. 440, fig. 1; *Lang* (Lycæna), *Butt. Eur.* 1884, p. 103, pl. 22, fig. 7; *de N. Butt. Ind.* iii, 1890, p. 91.
Lycæna putli, *Kollar, Hugel's Kaschmir*, iv, 1848, p. 422; *Moore* (Chilades), *Lep. Ceyl.* i, 1881, p. 77, pl. 35, figs. 4, 4 *a*.
Lycæna parva, *Murray, Trans. Ent. Soc.* 1874, p. 526, pl. 10, fig. 1.
Lycæna gnoma, *Snellen, Tijd. voor Ent.* xix, 1876, p. 159, pl. 7, fig. 1.

♂. *Upperside*: brown, somewhat variable in tint. Specimens from dry localities are much paler than those taken in areas with a comparatively heavy rainfall. Fore wing: uniform, with a very ill-defined anticiliary dark line in some specimens. Hind wing: a subterminal series of round black spots crowned with pale ochraceous, the posterior four spots generally well defined and outwardly edged with white, the anterior spots obsolescent and without the interior edging of yellow or the outer edging of white; a well-marked, slender anticiliary black line. Cilia white, basal halves brown. *Underside*: pale silky brown. Fore wing: with the following white markings:—a short line on the inner and outer sides of the discocellulars; a transverse, slightly curved, discal series of small, more or less incomplete rings; a transverse postdiscal series of disconnected slender lunules; a subterminal series of similar but more regular lunules and a terminal broken line, followed by a dark unbroken anticiliary line; the ground-colour between the two short discocellular lines, that enclosed within each ring of the discal markings, and between the subterminal lunules and the terminal line slightly darker than on the rest of the wing. Hind wing: two short white lines on the discocellulars; the discal, postdiscal and terminal markings as on the fore wing, except that enclosed between the subterminal series of white lunules and the terminal white line is a complete series of dark spots, the posterior three or four jet-black sprinkled outwardly with metallic-green scales and encircled with pale ochraceous. In addition there are a transverse subbasal series of four white-encircled black spots and a similar subcostal spot in middle of interspace 7. Antennæ, head, thorax and abdomen brown, the shaft of the antennæ speckled with white; beneath: palpi, thorax and abdomen white.—♀. *Upper* and *undersides*: ground-colour and markings as in the ♂, but the latter larger and more clearly defined; on the hind wing the yellow crowning the black spots on the tornal area on the upperside and surrounding the same on the underside, wider and more prominent. Antennæ, head, thorax and abdomen as in the ♂.

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* *Camponotus compressus*, Fabr., *vide* Faun. Brit. Ind., Hymenoptera, ii, 1903, p. 351.

Exp. ♂ ♀ 17–25 mm. (0·68–0·97").

Hab. Found throughout our limits, but not at any great elevation; occurs also in South-eastern Europe; in Africa, Arabia and Central Asia; extends through the Malayan Subregion to Australia.

Var. *putli*, Kollar, is the small Indian form which however, in ground-colour and markings is identical with *trochilus*.

Larva. "When full-grown a little over a quarter of an inch in length, launch onisciform as usual; the head very small, black and shining, entirely hidden when at rest, being covered by the second segment; the colour of the body grass-green, with a dark green dorsal line from the third to the twelfth segment; two subdorsal series of short parallel streaks, each pair being divided from the next by the segmental constriction, these streaks paler than the ground-colour; an almost pure white lateral line below the spiracles, which is the most conspicuous of all the markings; the segmental constrictions rather deep; the whole surface of the body shagreened, being covered with very small whitish tubercles, from which spring very fine short colourless hairs. The usual extensile organ on the twelfth segment. Dr. George King, Superintendent of the Royal Botanical Gardens, Sibpur, near Calcutta, has identified its food-plant as *Heliotropium strigosum*, Willd. Professor A. Forel identifies the ant as *Pheidole quadrispinosa*, Jerdon." (*de Nicéville.*)

Pupa. "About three-sixteenths of an inch in length, pale green, of the usual Lycænid shape, densely covered everywhere, except on the wing-cases, with somewhat long white hairs." (*de Nicéville.*)

Genus **ORTHOMIELLA.**

Orthomiella, *de Nicéville, Butt. Ind.* iii, 1890, p. 125.

Type, *O. pontis*, Elwes, from Sikhim.

Range. Sikhim; China.

♂ ♀. Fore wing: costa widely arched; apex subacute, well-marked but not produced; termen convex; tornus angulated: dorsum straight, about three-fourths the length of the costa; cell ample, a little longer than half the length of the wing; vein 7 from a little before apex of cell, upper discocellular therefore in line with subcostal; middle and lower discocellulars subequal, faintly marked; vein 3 from before lower apex of cell, 4 from lower apex, 5 from junction of middle and lower discocellulars, 6 from upper apex of cell, 8 absent, 9 from apical half of 7, 10 free, 11 anastomosed with 12 for a short distance, then extended free to costa, 12 terminates on costa well before apex of cell. Hind wing: costa slightly concave, apex obtusely angulate; termen anteriorly slightly concave, posteriorly strongly convex; tornus blunt, almost rounded; dorsum long, slightly arched; cell about half length of wing, middle and lower discocellulars oblique and convex; vein 3 from a little before lower apex of cell; vein 8 strongly arched at base, then straight to apex, running very close to the costal margin. Antennæ about half length of fore wing; club stout, abrupt, spatulate; palpi subporrect, somewhat lax, furnished with a bristly fringe of hairs anteriorly, third joint short, acicular; eyes hairy; body moderately stout.

A single form is found within our limits in Sikhim and in Upper Burma.

730. **Orthomiella pontis** (Pl. XIX, fig. 139), *Elwes* (Chilades?), *P. Z. S.* 1887, p. 446; *id.* (Chilades?) *Trans. Ent. Soc.* 1888, p. 384, pl. 8, fig. 5 ♂; *de N. Butt. Ind.* iii, 1890, p. 126, pl. 26, fig. 177 ♂.

♂. *Upperside*: deep purplish brown, the purple suffusion visible in some lights, not in others. Fore and hind wings: uniform, with dark brown, somewhat broad anticiliary lines. Cilia brown alternated with white. *Underside*: paler, somewhat silky brown. Fore wing: base thickly irrorated with black scales; cell transversely crossed in the middle and along the discocellulars by brown bars of a darker shade than the ground-colour of the wing; a transverse, somewhat irregular, catenulated, discal, similarly coloured band followed by a slightly paler, transverse, narrow, lunular, subterminal broad line, beyond which the ground-colour is earthy-brown, with a superposed terminal series of lunate spots in the interspaces. The cellular and discal markings are faintly edged with white, the terminal markings are generally very obscure. Hind wing: base, posterior half of cell and bases of interspaces 1 *a*, 1, 2 and 3 densely irrorated with black scales with irregular small patches of paler scales superposed thereon; a transverse, catenulated, subbasal dark brown band, a similar shorter band from costa across the discocellulars and a similar very irregular discal band from costa, all merged posteriorly into the irroration of black scales, followed as on the fore wing by an obscure, transverse, lunular, subterminal brown line, and a terminal row of ill-defined, similarly coloured, lunate spots. Antennæ dark brown, the shafts speckled with white; head, thorax and abdomen deep purplish brown; beneath: palpi, thorax and abdomen fuscous black.—♀. *Upperside*: dark brown. Fore wing: basal two-thirds brilliant purplish blue, much brighter than the purple sheen in the ♂. Hind wing: a medial area from base extended outwards for about two-thirds the length of the wing, purplish blue as on the fore wing. This colour not extended anteriorly to the costa or posteriorly to the dorsum. Cilia of both fore and hind wings as in the ♂. *Underside*: ground-colour and markings similar to those of the ♂, but the latter somewhat more clearly and neatly defined; on the hind wing the irroration of black scales at base and on the posterior half of the wing less extensive. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 30–32 mm. (1·18–1·26″).

Hab. So far recorded only from Sikhim, 6000 feet, and the North Chin Hills, Upper Burma.

Genus **NIPHANDA.**

Niphanda, *Moore, P. Z. S.* 1874, p. 572; *de N. Butt. Ind.* iii, 1890, p. 131.

Type, *N. tessellata*, Moore, from Penang.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa very nearly straight, slightly arched towards the apex; apex blunt but not rounded; termen convex; tornus obtuse, dorsum straight; cell not quite half length of wing; middle and lower discocellulars vertical, slender; vein 3 from before lower apex of cell, vein 7 from a little before upper apex of cell, vein 8 absent, 9 from middle of 7, 10 and 11 free; vein 12 bent a little downwards towards 11, terminates on costa opposite apex of cell. Hind wing: costa widely and regularly arched, the arch continued evenly to apex and termen which form a strong curve to tornus; tornus obtusely angulated; dorsum concave above tornus, then convex to base: cell remarkably short, not half length of wing; veins 3 and 4 from lower apex of cell; vein 8 arched at base, ending on costa before apex of wing. Antennæ long, over half length of fore wing, club long, gradual; palpi subporrect, densely clothed with short scales, not fringed with long hairs or bristles, third joint naked, comparatively long; eyes hairy.

731. **Niphanda cymbia**, *de Nicéville, J. A. S. B.* 1883, p. 76, pl. 9, figs. 8, 8 *a*, ♂ ♀: *id. Butt. Ind.* iii, 1890, p. 132, frontispiece, figs. 130, 131, ♂ ♀.
Niphanda plinioides, *Moore, P. Z. S.* 1883, p. 524, pl. 48, fig. 8 ♀.

Race marcia (Pl. XX, fig. 146 ♂).

Lycæna (Niphanda) marcia, *Fawcett, P. Z. S.* 1904, p. 139, pl. 9, fig. 7.

♂. *Upperside*: violet with a brilliant effulgence in fresh specimens. Fore wing: costa and termen narrowly edged with dark brown, a dark brown transverse short streak also on the discocellulars. Hind wing: costa, termen and discocellulars marked as in the fore wing, but the dark brown edging slightly broader, on the termen it is produced obscurely inwards in the posterior interspaces; dorsum somewhat broadly dusky brown. *Underside*: dull whitish. Fore wing: basal half of costa shaded with brown; a streak from base between vein 12 and the subcostal vein, an inwardly oblique, very broad, lunular subbasal spot, a spot on the discocellulars, a transverse discal band, a transverse subterminal series of inwardly conical spots and a slender anticiliary line, dark brown; the transverse discal band is maculate and broken, its anterior portion to vein 3 outwardly oblique, its posterior portion below vein 3 shifted well inwards and nearly vertical; the costa above vein 12, a postdiscal transverse irregular cloud very broad anteriorly, narrow and faint posteriorly, and a transverse inner subterminal lunular line, pale brown. Hind wing: the humeral edge of the precostal area, two or three basal spots, a transverse subbasal line of four spots, a transverse spot on the discocellulars, with above it in vertical order two coalescent spots, a transverse curved macular discal band, an inner, subterminal, lunular, continuous broad band, a subterminal series of spots and an anticiliary line, brown; the basal and subbasal markings, the anterior of the two spots above the discocellular spot, and the posterior four subterminal spots very dark brown, almost black. The discal band has on either side of it posterior shorter macular bands, that give it an irregular and ill-defined appearance, while the two spots nearest the costa of the inner markings are very large and prominent. Cilia of both fore and hind wings brown. Antennæ, head, thorax and abdomen brown, the thorax slightly purplish in fresh specimens, the shafts of the antennæ ringed with white; beneath: palpi, thorax and abdomen dingy brownish-white.—♀. *Upperside*: brown. Fore wing: the costal and terminal margins, and the area below the basal half of the cell of a darker brown than the ground-colour; an irregular transverse posterior discal series of dark brown spots, between which and the dark basal area on the inner side and between it and the broad dark terminal band on the outer side the ground-colour is replaced by dingy white. Hind wing: a postdiscal series of white spots, and a subterminal series of inwardly conical very dark brown spots, the posterior spots of which are edged narrowly both on the inner and outer sides with white. Both fore and hind wings with slender black anticiliary lines. *Underside*: ground-colour a purer white than in the ♂; markings similar but all narrower and more clearly defined. Antennæ, head, thorax and abdomen brown, of a paler shade than in the ♂, the thorax not purplish; beneath: palpi, thorax and abdomen white.

Exp. ♂ ♀ 35–39 mm. (1·37–1·52").

Hab. Sikhim.

A variable form, especially the females. A specimen of the latter in the collection of the British Museum has on the upperside the bases of both fore and hind wings suffused with dull blue, the white area on the fore wing of a purer shade and more extensive; the hind wing has the whole of the disc between the basal suffusion of blue and the terminal markings white. On the underside both sexes vary very much in the size and clearness of definition of the markings, and the variety just mentioned has these (especially the terminal markings) partially obsolescent.

Race **marcia**, Fawcett.—A very slightly differentiated form. Differs from typical *cymbia* as follows:—♂. *Upperside*: similar, the purple ground-colour in the only two specimens that I have had an opportunity of examining slightly brighter. *Underside*, fore wing: ground-colour slightly greyish or bluish-white; the basal dark brown streak shorter, the lunular dark brown mark beyond it replaced by an irregular upper and lower spot distinctly divided by the median vein; the discal and postdiscal markings similar but narrow, edged with white and distinctly paler. Hind wing: the anterior half of the cell and up to the costa above it, the base of the wing and the disc shaded with greyish brown; the brown spots and maculated bands paler, except the large spot nearest the costa of the transverse subbasal row of spots, and the two spots (which are of equal size) above the discocellular spot; terminal markings all paler and fainter than in the typical form.—♀. Very similar to the variety of *cymbia* described briefly above, but on the upperside the blue suffusion at the base of the wings is replaced by pale brown and on the hind wing the area of white on the disc is less extensive. *Underside*: very similar to the underside of the typical form, the markings all slightly smaller, paler and less prominent.

Exp. ♂ ♀ 28–35 mm. (1·10–1·37″).

Hab. Recorded so far only from Burma: Taungoo, Mergui, the Shan States.

Genus LYCÆNESTHES.

Lycænesthes, *Moore, P. Z. S.* 1865, p. 773; *id. Lep. Ceyl.* i, 1881, p. 87; *de N. Butt. Ind.* iii, 1890, p. 127.

Type, *L. emolus*, Godart, from India.

Range. Indo- and Austro-Malayan Regions.

♂ ♀. Fore wing: costa very slightly arched; apex subacute; termen convex; tornus almost a right angle; dorsum straight; cell long, more than half the length of the wing; vein 7 from before upper apex of cell, upper discocellular therefore in line with subcostal vein, middle and lower discocellulars vertical, subequal; veins 1 and 2 very wide apart at base; veins 2 and 3 given off from apical fourth of median vein, vein 4 from lower apex of cell, 6 from upper apex of cell, 8 absent, 9 from apical half of 7, 10 and 11 free, 12 terminates on costa before apex of cell; veins 1 and 12 and median and subcostal veins thickened towards base. Hind wing: broad; costa widely arched; apex and tornus well marked; termen convex; short projections (scarcely tails) at apices of veins 1 to 3; dorsum only slightly convex; cell about half length of wing; middle and lower discocellulars concave and sloping obliquely outwards; veins 1 *a*, 1, median and subcostal veins and vein 8 all distinctly thickened towards base; veins 3 and 4 closely approximate from lower apex of cell; vein 8 strongly arched at basal third and extended parallel and very close to the costal margin up to apex of wing. Antennæ comparatively long, longer than half length of fore wing; club long, gradual, acute at apex; palpi porrect, anteriorly fringed with stiff hairs, third joint long, naked; eyes hairy; body robust.

Key to the forms of Lycænesthes.

a. Underside hind wing: no distinct dark brown or black white-encircled spot touching vein 7 near base .... *L. emolus*, p. 373.
b. Underside hind wing: a very distinct dark brown or black white-encircled spot touching vein 7 near base .... *L. lycænina*, p. 375.

732. **Lycænesthes emolus**, *Godart* (Polyommatus), *Encycl. Méth.* ix, 1823, p. 656; *de N. Butt. Ind.* iii, 1890, p. 128; *Davidson, Bell & Aitken. Jour. Bomb. N. H. Soc.* x, 1896, p. 374.
Lycænesthes bengalensis, *Moore, P. Z. S.* 1865, p. 773, pl. 41, fig. 9 ♂.

♂. *Upperside*: dull purple; bases of the wings suffused with blue: both fore and hind wings with well-marked jet-black anticiliary lines, that on the fore wing expand slightly at the apex. Hind wing: the costal margin above vein 7 and the dorsal margin below vein 1 *a* fuscous brown; irregular, transverse, subterminal black spots in interspaces 1 to 3, those in interspaces 1 and 2 much larger than that in interspace 3; posterior basal area covered with long purplish-brown hairs. Cilia of both fore and hind wings brown. *Underside*: purplish brown with a smooth satiny lustre. Fore wing: a short band on the discocellulars, a transverse comparatively broad discal band with very sinuate margins, and a subterminal, continuous, lunular, much narrower band; the former two brown, of a shade darker than the ground-colour, the subterminal band fuscous black; the band on the discocellulars and the discal band edged narrowly with white both on the inner and outer sides, the subterminal band very obscurely similarly edged on the outer side only. Hind wing: somewhat densely irrorated with black scales at extreme base and crossed transversely by seven or eight very irregular lines of slender white lunules; the outer two lines outwardly concave, the others outwardly convex, each lunule of the inner line of the former two series touching the corresponding lunule of the line next to it on the inner side, so that in each interspace the two touching lines of lunules seem to form a series of markings like X; finally, a white-edged black spot in the middle of the dorsum and another subterminal black spot crowned inwardly with orange in interspace 3. Both fore and hind wings with slender jet-black anticiliary lines and brown cilia, the anticiliary line on the hind wing edged inwardly and outwardly by a white thread. Antennæ black, the shafts speckled with white; head, thorax and abdomen purplish brown.—♀. *Upperside*: brown, the bases of the wings glossed with pale violet-blue on the fore wing, in some specimens extended for two-thirds the length of the wing but always more or less of a broad margin of the ground-colour is left along the costa, a still broader margin along the termen and a narrow edging along the dorsum; on the hind wing the blue gloss rarely extends further than the basal third. Both fore and hind wings with slender anticiliary black lines, that on the hind wing posteriorly is inwardly margined with a thread of white, on the inner side of which again and touching it are three or four conical or triangular small black spots in the interspaces. Cilia of both wings pale brown. *Underside*: ground-colour slightly paler, markings similar. Antennæ blackish brown, the shafts speckled with white as in the ♂; head, thorax and abdomen brown; beneath: the palpi, thorax and abdomen paler brown.

Exp. ♂ ♀ 29–35 mm. (1·14–1·34").

Hab. Within our limits, Eastern India: Sikhim, Bengal, Orissa; Western India: Karwar; Assam; Burma; Tenasserim; the Andamans; extending into the Malayan Subregion as far as New Guinea.

Specimens from the Andamans differ constantly in the darker shade of the purplish-blue above and on the underside by the narrowness of the transverse discal band on the fore wing, which is also more irregular and catenulate in form, the posterior link or spot not in line with the others.

Larva. "When full-fed ·62 of an inch in length, somewhat dark green in colour (of a darker shade than most Lycænid larvæ), smooth and shining, the whole surface covered with minute pits to be seen only under a strong magnifying-glass. The head is very small and retractile as usual and of a pale green colour; the second segment is unmarked, the third to sixth segments inclusive have some obscure reddish-brown dorsal blotches, the three following segments are unmarked, the tenth to twelfth segments have somewhat similar blotches to those on the third to the sixth segments, but they are more distinct and and darker in shade. There is a pale yellow lateral line just above the legs. All the segments are irregularly and broadly pitted at the sides; these pits seem to assume more or less the form of a longitudinal subdorsal depression, below which to the lateral line the colour of the insect is slightly paler. The whole larva is much depressed, somewhat wider than high and seems to gradually increase in breadth to the tenth segment, the last segment is almost as broad and rounded. The larva varies greatly in colour and markings, some being pale green throughout and unmarked, others again are reddish brown throughout. It feeds in Calcutta on *Nephelium litchi*, Lamb., *Cassia fistula*, Linn., and *Heynea trijuga*, Roxb., and not improbably, as it feeds on so many bushes, it will eat others. Dr. Forel identifies the ant which attends the larva as *Œcophylla smaragdina*, Fabr., the large red and green ant which makes immense nests of growing leaves in trees." (*de Nicéville.*)

Pupa. "0·4 of an inch in length, of the usual Lycænid shape, the tail pointed, the thorax slightly humped and ending in a somewhat sharp ridge line on the back; it is coloured pale ochraceous and bears a prominent diamond-shaped mark posteriorly. It is smooth throughout, reddish brown sprinkled with minute darker dots." (*de Nicéville.*)

733. **Lycænesthes lycænina,** *Felder, Verh. zool.-bot. Ges. Wien,* xviii, 1868, p. 281; *Moore, Lep. Ceyl.* i, 1881, p. 87, pl. 35, figs. 8, 8*a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 130, pl. 26, fig. 178 ♂; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 374.
Lycænesthes lycambes, *Hewitson, Ill. Di. Lep.* 1862-1878, p. 220, pl. 90, figs. 11, 12, ♂.
Lycænesthes orissica, *Moore, J. A. S. B.* 1884, p. 23.

Closely resembles *L. emolus*, Godt. In both sexes however, but especially in the ♂, the fore wing is distinctly narrower and more acute at apex and the hind wing more acutely angulated at the tornus. In markings on the upperside the two forms are closely alike; on the underside they differ as follows:—♂ ♀. Ground-colour similar but a shade darker. Fore wing: the transverse discal band dislocated below vein 3 and shifted inwards so that the short band on the discocellulars and the anterior portion of the discal band form the two branches, the lower portion of the discal band the stem, of a rough Y-shaped figure. Hind wing: a large black or dark brown white-encircled spot touching vein 7 near its base (in *L. emolus* there is never any trace of such spot). The discal and terminal transverse bands with their pale or white edgings much more broken, irregular and confused. Antennæ, head, thorax and abdomen as in the ♂ ♀ of *emolus*, but on the underside the palpi, thorax and abdomen whiter with a slight bluish tint.

Exp. ♂ ♀ 28–32 mm. (1·10–1·26").

Hab. Sikhim; Bengal; Orissa; Western and Southern India; Ceylon; Assam; Burma; Tenasserim; extending to Siam; the Malay Peninsula; Borneo.

Genus TALICADA.

Talicada, *Moore, Lep. Ceyl.* i, 1881, p. 96; *de N. Butt. Ind.* iii, 1890, p. 134.

Type, *T. nyseus*, Guérin, from India.

Range. Western and Southern India; Ceylon; Assam; Upper Burma.

♂ ♀. Fore wing: costa widely arched, more strongly just at base; apex rounded; termen convex; tornus obtuse; dorsum slightly sinuate; cell long and narrow, slightly over half length of wing; middle and lower discocellulars attenuated, subequal; veins 3 and 7 almost from lower and upper apices of cell respectively; veins 3 and 4 and veins 6 and 7 respectively very closely approximate at base; vein 8 absent, 9 from middle of 7, 10 and 11 from apical half of subcostal; vein 11 anastomosed with 12, forming merely an oblique bar between 12 and the subcostal vein. Hind wing: oval; costa, termen and dorsum form a continuous curve, apex and tornal angle not well marked; cell less than half length of wing, narrow; middle and lower discocellulars obsolescent; veins 3 and 4 from lower apex of cell; vein 8 arched at base, extended very close along the costal margin to apex. Antennæ a little longer than half length of fore wing, club elongate, gradual but distinct; palpi subporrect, third joint very long, naked; eyes naked.

734. **Talicada nyseus** (Pl. XIX, fig. 140 ♀), *Guérin* (Polyommatus), *Delessert's Souv. d'un Voy. dans Inde*, 1843, p. 78, pl. 22, figs. 1, 1*a*; *Butler* (Scolitantides), *P. Z. S.* 1881, p. 607; *Moore, Lep. Ceyl.* i, 1881, p. 97, pl. 39, figs. 1, 1*a*, 1*b*, ♂, larva & pupa; *de N. Butt. Ind.* iii, 1890, p. 135, pl. 26, fig. 179 ♀; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 375, pl. 4, figs. 1, 1*a*, larva & pupa.

♂ ♀. *Upperside*: black or brownish black, in fresh specimens in certain lights with a dull purplish flush. Fore wing: uniform, with a very slender thread-like edging of white to the costa. Hind wing: a large conspicuous orange-red patch on the posterior terminal half of the wing between the dorsum and vein 7; this patch does not extend quite to the termen but leaves a narrow edging of the black ground-colour which is produced inwards in short conical projections in interspaces 2 to 5. Cilia of both fore and hind wings chequered with black and white alternately. *Underside:* silvery white. Fore wing: a quadrate spot on the discocellulars, a broad transverse discal band and the terminal third of the wing jet-black; the discal band is irregular, dislocated on vein 3, the posterior portion shifted inwards and joined on to the black area on the posterior terminal third of the wing by projections of black on the dorsum, along veins 3 and between veins 4 and 5; the black area on terminal third of the wing encloses a transverse postdiscal series of small round and a subterminal transversely linear series of spots of the white ground-colour. Hind wing: two spots near base, a subbasal transverse series of three spots, a medial similar series of four somewhat elongate spots and a transverse short postdiscal bar between veins 4 and 6, jet-black; terminal third of the wing above vein 7 jet-black, below that vein deep orange-red, the whole area (both the black and the red) medially traversed by a transverse curved series of round spots of the white ground-colour and margined outwardly by a series of transverse, very short and very slender lines of the same in the interspaces; anticiliary line black. Cilia of both fore and hind wings chequered as on the upperside; a short filamentous tail at apex of vein 2 black, tipped white. Antennæ, head, thorax and abdomen black, shafts of the antennæ ringed with white; beneath: palpi, thorax and abdomen white.

Exp. ♂ ♀ 33–42 mm. (1·30–1·64″).

Hab. Central, Western and Southern India; Ceylon; Assam; Upper Burma.

Larva & Pupa. "Onisciform, but much rounded, and with the segments at the divisions very clearly defined; head small, almost concealed; last segment flattened. It is in colour fleshy-white, with a row of nine small black dots along the back on each side and a ring of four similar dots on the segment nearest the head; it is profusely covered with small white hairs. It feeds in the interior of the fleshy leaves of *Bryophyllum calycinum*, only emerging in order to turn into a pupa. This latter much resembles the larva, being short and stout and blunt and covered with short white hair. It is of the same fleshy colour as the larva and has two lines of small black dots along the surface of the abdomen continued along the thorax. It also has a third row of four similar dots on the middle of the abdomen between them; the two dots on the thorax nearest the head are also connected by two other dots." (*Davidson, Bell & Aitken.*)

Genus **EVERES**.

Everes, *Hübner, Verz. bek. Schmett.* 1816, p. 69; *Moore, Lep. Ceyl.* i, 1881, p. 85; *de N. Butt. Ind.* iii, 1890, p. 136.

Type, *E. argiades*, Pallas, from S. Europe.

Range. The Holarctic Region; Indo- and Austro-Malayan Regions.

♂ ♀. Fore wing: costa widely arched; apex blunt, slightly rounded; termen strongly convex; tornus obtuse; dorsum straight; cell about half length of wing; middle and lower discocellulars more or less obsolescent; vein 3 from a little before lower apex of cell, vein 7 from well before upper apex of cell, upper discocellular therefore in line with and part of subcostal vein; vein 8 absent; vein 9 from middle of 7; vein 10 from middle of subcostal; 11 from basal half of subcostal running into and anastomosed with vein 12 soon after its origin; vein 12 terminated on costa above and well before apex of cell. Hind wing: costa very little arched; apex more or less rounded; termen very strongly curved; tornus not well marked; dorsum slightly convex; cell not half length of wing; veins 3 and 4 closely approximate at base from lower apex of cell; vein 8 only slightly curved at base, terminated on costal margin well before apex of wing. Antennæ over half length of costa of fore wing, club gradual but comparatively large; palpi porrect, clothed with scales in front, not fringed, third joint long, acicular, naked; eyes naked; body long and comparatively slender.

Key to the forms of Everes.

A. Upperside: ground-colour purplish-blue or blue, rarely in ♀ brown .... *E. argiades*, p. 378.
B. Upperside: ground-colour fuscous black.
  a. Underside: transverse discal band on both fore and hind wings macular, spots not continuous or touching .... *E. kala*, p. 380.
  b. Underside: transverse discal band on both fore and hind wings macular but continuous though interrupted in the middle .... *E. potanini*, p. 379.

735. **Everes argiades** (Pl. XIX, figs. 141, 142, ♂ ♀), *Pallas* (Papilio), *Reise*, i, 1771, App. p. 472; *Elwes* (Lycæna), *P. Z. S.* 1881, p. 887; *Lang* (Lycæna), *Butt. Eur.* 1884, p. 101, pl. 22, fig. 5, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 137, pl. 26, fig. 180 ♂.
Hesperia parrhasius, *Fabr. Ent. Syst.* iii, 1793, p. 289; *Moore* (Lycæna), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 22, pl. 1 *a*, fig. 3, ♂; *id.* (Everes) *Lep. Ceyl.* i, 1881, p. 85, pl. 36, fig. 7.
Lycæna dipora, *Moore*, *P. Z. S.* 1865, p. 506, pl. 31, fig. 8 ♂; *Doherty* (Everes), *J. A. S. B.* 1886, p. 132.

A very variable form especially in the colouring on the upperside in the ♀. ♂. *Upperside*: violet of lighter or darker shade. Fore wing: a terminal edging of brown of varying width and an obscure anticiliary black line; costa generally with a very narrow line of brown; cilia brown at base, white outwardly. Hind wing: costal margin more or less broadly brown, this brown edging continued in some specimens down the termen to the tornal angle, in others only for a short distance or not at all; subterminal black spots in the posterior three or four interspaces, the one in interspace 2 largest, the two in interspace 1 minute, sometimes geminate; generally the spots are outwardly edged very narrowly with white; finally, an anticiliary slender black line much more prominent than on the fore wing; tail black tipped with white. *Underside*: white to brownish grey, the markings sometimes prominent, very often pale and faint, those constituting the discal bands on both fore and hind wings round and black, or transverse, linear and pale brownish. Fore wing: a short transverse line on the discocellulars; a transverse discal row of spots followed by an inner and an outer subterminal maculate band which may be slender and well marked or with the inner band broad and each spot composing it diffuse; finally, an anticiliary very slender black line Hind wing: a transverse subbasal series of two sometimes three black spots; a slender short brownish line on the discocellulars; a transverse, discal, bisinuate series of black spots followed by a somewhat obscure postdiscal transverse series of black or pale brownish lunules, a subterminal series of black spots and a slender anticiliary black line; the sub-

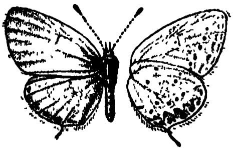
Fig. 84.
Everes argiades.

terminal portions of interspaces 2 and 3, sometimes of 4 and 5 also, that lie between postdiscal series of lunules and the outer edge of the subterminal row of spots ochraceous yellow, the spots themselves in interspaces 2 and 3 much larger than the others. Antennæ black, the shafts speckled as usual with white; head, thorax and abdomen brown, with a pale purplish flush on the thorax and abdomen in fresh specimens; beneath: palpi, thorax and abdomen white or grey.—♀. *Upperside*: in the commonest form dark greyish-blue. Fore wing: the costa, apex and termen very broadly fuscous-black, with an obscure black anticiliary line as in the ♂. Hind wing: as in the ♂ but the costal dusky brownish-black edging much broader, always more or less continued along the termen; the subterminal rows of spots often nearly complete to apex, those in interspaces 2 and 3 very large and crowned inwardly with ochraceous yellow, in some specimens more or less obsolescent. Specimens of the ♀ with the ground-colour on the upperside entirely brown and the terminal markings on the hind wing indistinct are not uncommon. *Underside*: as in the ♂, the markings on the whole more distinct. Antennæ, head, thorax and abdomen as in the ♂, but without the purplish flush seen on some specimens of the latter.

Exp. ♂ ♀ 23–30 mm. (0·92–1·17″).

Hab. The Holarctic Region. Within our limits almost throughout India; Ceylon; Assam; Burma; Tenasserim; extending through the Malayan Subregion to Australia.

Specimens from very dry localities in Upper Burma and from Great Nicobar Island are remarkably small and pale, with the markings on the underside, especially the subtornal ochraceous yellow patch, more or less obsolescent.

Larva. "Pale green with a darker dorsal stripe, dark lateral streaks, and light brown and white spots. Feeds on trefoil and other Leguminosæ." (*Lang.*)

Pupa. "Longer and slenderer than in *Cyaniris*, being nearly four times longer than broad, the abdomen but slightly more elevated than the thorax, and the whole body covered with long distant hairs, by which they may be readily distinguished; in colour they resemble the caterpillar, or are darker and spotted with black." (*Scudder.*)

736. **Everes potanini,** *Alphéraky* (Lycæna), *Rom. Mém.* v, 1889, p. 104, pl. 5, fig. 4 ♂; *Leech, Butt. China,* 1893–1894, p. 332, pl. 31, fig. 2 ♂.
Everes umbriel, *Doherty, J. A. S. B.* 1889, p. 433, pl. 23, fig. 1; *de N. Butt. Ind.* iii, 1890, p. 141.

♂ ♀. *Upperside*: deep brownish-black, markings of the underside faintly apparent through transparency. Fore wing: an obscure slender anticiliary line darker than the ground-colour; cilia, except at and just above the tornus, brown along the base, white outwardly; at tornal area pure white with a little brown at apex of vein 1. Hind wing: a subterminal series of black spots, outwardly in some specimens obscurely, edged with white and on the inner side by a transverse continuous series of pale lunules, the posterior two or three sometimes touched with white; a short filamentous tail of the ground-colour tipped with white at apex of vein 2; between the tail and the tornal angle the subterminal black spot is elongated into a short transverse streak; cilia pure white, between the tail and the tornus outwardly brown. *Underside*: very pale grey. Fore wing: a short transverse streak on the discocellulars, two elongate transverse spots one above the other in an oblique line with it below; an upper transverse discal maculate band from vein 3 to vein 7, a transverse, postdiscal, very sinuous broad line followed by a subterminal series of elongate spots, the one nearest the apex of the wing large and rounded, and a slender anticiliary line, brownish black; all these markings except the anticiliary line edged inwardly and outwardly with white. Hind wing: markings very similar to those on the fore wing but the transverse, upper, discal short band broken in the middle, and in addition three transversely placed similarly coloured subbasal spots. Antennæ, head, thorax and abdomen dark brownish-black, the shafts of the antennæ speckled with white; beneath: palpi, thorax and abdomen white.

Exp. ♂ ♀ 30–32 mm. (1·20–1·26″).

Hab. Within our limits, Burma: the Karen Hills; Tenasserim; extending to Western China.

737. **Everes kala,** *de Nicéville, Butt. Ind.* iii, 1890, p. 139, pl. 26, fig. 181.

♂ ♀. *Upperside*: fuscous black. Fore and hind wings: jet-black anticiliary slender lines and on the hind wing traces of a subterminal line of black spots. Cilia, fore wing: dusky brown; hind wing: white alternated with brown at the apices of the veins. *Underside*: white with a greyish tint on the fore wing except on the posterior terminal third and on the hind wing on the basal area anteriorly. Fore wing: a slender, short, black transverse line on the discocellulars, a transverse discal row of six prominent black spots as follows:—posterior three elongate, placed obliquely and *en échelon*, the next spot above also elongate and posited almost horizontally, the anterior two round and curved inwards; a transverse inner subterminal series of black lunules, an outer similar series of minute black dots and an anticiliary slender black line; cilia white alternated with brown at the apices of the veins. Hind wing: a transverse subbasal series of three black spots, the posterior spot minute, a transverse black spot on the middle of the dorsal margin, a transverse slender black lunule on the discocellulars, and a prominent, transverse, somewhat irregularly curved discal row of black spots posited as follows:—posterior two slightly elongate and placed *en échelon*; of the three spots next above, the middle spot is elongate and placed longitudinally, the other two are round, the anterior two spots are round, shifted a little inwards out of line, the one nearest the costa very large and conspicuous; terminal markings and cilia as on the fore wing. Antennæ black, the shafts speckled with white; head, thorax and abdomen fuscous black; beneath: palpi, head, thorax and abdomen white.

Exp. ♂ ♀ 21–25 mm. (0·84–1·00″).

Hab. Recorded so far only from Assam: Khási Hills; Cherrapungyi.

The late Mr. de Nicéville noted the similarity of this form to *E. fischeri*, Eversmann, from Central Asia and China, but the few specimens I have seen seem to me quite distinct from any of the numerous specimens of *E. fischeri* in the collection of the British Museum.

Genus **NACADUBA.**

Nacaduba, *Moore, Lep. Ceyl.* i, 1881, p. 88; *de N. Butt. Ind.* iii, 1890, p. 141.

Type, *N. atrata*, Horsfield (*N. prominens*, Moore), from Ceylon.

Range. Africa, and the Indo-Malayan Region to Australia.

♂ ♀. Fore wing: costa widely arched; apex blunt; termen convex, more so in the ♀ than in the ♂; tornus obtuse; dorsum straight; cell about half length of wing; vein 3 from a little before lower apex of cell, veins 6 and 7 closely approximate, the latter from a little before upper apex of cell; upper discocellular forms part of subcostal, middle and lower discocellulars nearly obsolescent; vein 8 absent, vein 9 from middle of 7, vein 10 from apical third of subcostal; vein 11 closely approximate at base to vein 10, anastomoses with vein 12 for a short distance, then runs free to costa; vein 12 terminates on costa nearly opposite apex of cell. Hind wing: subtriangular; costa widely arched; apex blunt, not well marked; termen slightly convex; tornus fairly well marked, angular; dorsum convex; cell short, discocellulars nearly obsolescent; veins 3 and 4 from lower apex of cell or from a little beyond; vein 8 well arched at base, terminates at costa before apex of wing. Antennæ about half length of fore wing, club gradual; palpi short, porrect, heavily fringed anteriorly, third joint short, bare; eyes hairy; body comparatively slender.

Key to the forms of Nacaduba *.

A. Underside fore wing: basal area unmarked.
  a. Underside: white transverse strigæ across both wings very broad and somewhat diffuse, on hind wing frequently contorted and confused.
    a'. Upperside: deep purplish brown with a silvery frosted appearance in certain lights............................ } *N. macrophthalma*, p. 382.

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* This key does not include *N. noreia*, Felder, of which I have not seen a specimen.

b'. Upperside: pale violet with no silvery frosted sheen but in some specimens both fore and hind wings with white patches. *N. kerriana*, p. 384.

b. Underside: tranverse white strigæ across both wings very narrow, never diffuse and very regular .... *N. pavana*, p. 385.

B. Underside fore wing: basal area marked with transverse white strigæ.

a. Fore wing: apex not conspicuously acute; hind wing not compressed or prolonged posteriorly.

a'. Underside fore wing: basal two transverse white strigæ not extended to vein 1.

a^2. Underside fore wing: fascia formed by discal two transverse white strigæ not extended to vein 1.

a^3. Underside fore wing: fascia formed by discal two transverse white strigæ interrupted at veins 3 and 6, upper and lower portions of fascia shifted inwards .... *N. bhutea*, p. 386.

b^3. Underside fore wing: fascia formed by discal two transverse white strigæ interrupted at vein 3 only, lower portion of fascia shifted inwards .. *N. dana*, p. 386.

b^2. Underside fore wing: fascia formed by discal two transverse white strigæ extended to vein 1.

a^3. Hind wing: short filamentous tails at apex of vein 2 .... *N. ancyra*, p. 395.

b^3. Hind wing without tails .... *N. hampsoni*, p. 387.

b'. Underside fore wing: basal two transverse white strigæ extended to vein 1.

a^2. Expanse under 25 mm............... *N. ardates*, p. 391.

b^2. Expanse over 25 mm.

a^3. Underside: transverse white strigæ across wings are filled in with dark brown and form prominent bands. . *N. cœlestis*, p. 393.

b^3. Underside: transverse white strigæ across wings, each pair narrowly edged inwardly with fuscous but not so as to form prominent bands.

a^4. Upperside brownish purple...... *N. atrata*, p. 388.

a^4. Upperside darker brownish purple suffused with plumbeous ...... } *N. plumbeomicans*, p. 389.

b. Fore wing: apex very acute; hind wing compressed and slightly prolonged posteriorly .... *N. hermus*, p. 394.

738. **Nacaduba macrophthalma**, *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 483; *id.* (Lycæna) *Novara Reise, Lep.* ii, 1865, p. 275, pl. 34, fig. 35 ♂; *Moore, Lep. Ceyl.* i, 1881, p. 89, pl. 37, figs. 4, 4 *a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 143.

A very variable form both in the shade of the ground-colour on the upperside and in the width, and more or less in the arrangement also of the transverse white lines that cross the wings.

Typical ♂.—*Upperside*: deep purplish-brown with a curious minutely granular roughened appearance; in certain lights the purple shines with iridescent blue tints. Fore and hind wings: uniform; both with slender anticiliary black lines; on the hind wing the black spots on the tornal angle on the underside show through by transparency. Cilia brownish; filamentous tail at apex of vein 2 on the hind wing black tipped with white. *Underside*: brown with a slight silky lustre. Fore and hind wings: with the following transverse, more or less broken, slender, dull whitish bands:—two short bands, one on either side of the discocellulars; a discal pair, the posterior portion below vein 3 shifted inwards, thus forming the stem of a rough **Y**-shaped figure of which the pair of bands along the discocellulars and the anterior portion of the discal two bands may be said to form the branches; beyond these are an inner and an outer subterminal lunular line, a terminal very slender more continuous line and a jet-black anticiliary line; all these markings faint or obsolescent along the costa. Hind wing: a subbasal pair of similar, dull whitish slender bands or interrupted lines, two shorter ones, one on either side of the discocellulars, and a much curved and very much interrupted pair of discal lines, the portion of which below vein 3 is shifted inwards as on the fore wing; terminal markings much as on the fore wing but ending at vein 3, posterior to which in interspace 2 is a large round black spot, in interspace 1 a smaller black spot, both spots crowned inwardly with ochraceous and edged outwardly with white, also both black spots are sprinkled on their outer edges with metallic blue scales. Antennæ, head, thorax and abdomen dark brown, a little purplish on the thorax; beneath: the palpi white mixed with black hairs that form a stiff fringe; thorax and abdomen brownish white. *Typical* ♀.—*Upperside*: dark brown. Fore and hind wings posteriorly for two-thirds of their length glossed with iridescent purplish-blue. *Underside*: similar to that of the ♂, the markings more clearly defined. Antennæ, head, thorax and abdomen as in the ♂, but the shafts of the antennæ speckled with white.

Exp. ♂ ♀ 30–33 mm. (1·16–1·30").

Hab. Sikhim; Bhutan; Southern India: the Nilgiris; Ceylon: Assam; Burma; Tenasserim; Andamans; Nicobars; extending into the Malayan Subregion as far as Australia.

Specimens which may belong to wet-season broods differ as follows:—♂. *Upperside*: ground-colour darker. *Underside*: ground-colour fuscous brown, much darker than in the typical form, the transverse white lines or bands further apart, the space enclosed between the discocellular pair and between the discal pair darker than the ground-colour. On the hind wing the white lines are medially interrupted by a very broad longitudinal fuscous-black streak that extends from the base of the wing to the inner subterminal, transverse, lunular white line. ♀. Does not seem to differ from the ♀ of the typical form.—Still other specimens, the difference in which may be due to locality or season (I have not been able to examine a sufficient number of dated and exactly localized specimens to make certain) seem to be intermediate between typical *macrophthalma* and typical *kerriana*, Distant. These specimens differ from *macrophthalma* as follows:—♂. *Upperside*: anticiliary black lines on both fore and hind wings distinctly broader, more pronounced. *Underside*: transverse white lines on both fore and hind wings much broader with a tendency to become diffuse and shift inwards or outwards and thus change the pattern; this is especially conspicuous on the hind wings of some of the specimens where the typical pattern is altogether confused and lost by the presence of additional short lunular white lines, and the shifting obliquely inwards or outwards of some of the lines that make up the typical pattern. There is, however, no abrupt change, intermediate specimens seem to link the most aberrant with the typical. Some of the specimens before me show also a tendency to the development of transverse series of dark subterminal spots on the underside of the fore wing as in *N. kerriana*, Distant.—♀. Similar to the ♀ of the typical form but on the upperside the iridescent blue at the base of the wings changes gradually to whitish on the disc and beyond the apex of cell. *Underside*: with broad transverse white lines as in the male varieties.

Exp. ♂ ♀ 34–40 mm. (1·34–1·58″).

739. **Nacaduba kerriana**, *Distant, A. M. N. H.* (5) xvii, 1886, p. 253; *id. Rhop. Malay.* 1886, p. 455, pl. 42, fig. 12 ♂; *de N. Butt. Ind.* iii, 1890, p. 146.

♂. *Upperside*: pale violet; in one specimen with white spots in the cell and on the disc of the fore wing, and on the hind wing with a white bar on either side of the discocellulars and a transverse, ill-defined, discal series of elongate white spots that increase in length anteriorly till in interspace 6 the white occupies the whole of the basal half. Fore wing: costa and termen evenly edged with dark brown, slightly broader at the apex of wing. Hind wing: costal margin dusky; a transverse, anteriorly ill-defined, subterminal series of dark brown spots and a distinct comparatively broad anticiliary line of the same colour. *Underside*: very pale greyish brown. Fore wing: a very broad transverse vertical discal bar extended from vein 1 to vein 7; a much shorter bar on the inner side of the discocellulars and another postdiscally extended between veins 3 and 7; terminal margin broadly white, transversely traversed by two parallel rows of linear spots; finally, a very prominent anticiliary black line. Hind wing: so very densely crossed by more or less coalescent white bars as to reduce the ground-colour to a series of transverse, irregular, greyish-brown strigæ on a white background; terminal markings consist as on the fore wing of a double parallel transverse subterminal series of black spots most of them transversely linear, but the spots in interspace 6 of the inner series and that in interspace 2 of the outer series very large, round and prominent; these are followed by a very slender jet-black anticiliary line. Cilia of both fore and hind wings brown. Antennæ black, shafts obscurely speckled with white; head, thorax and abdomen dark brown, slightly purplish on the thorax; beneath: palpi fringed with black hairs, thorax and abdomen white.— ♀. Unknown.

Exp. ♂ 40 mm. (1·58″).

Hab. Tenasserim; extending to the Malay Peninsula; Borneo.

740. **Nacaduba pavana,** *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1828, p. 77; *Wood-Mason & de N., J. A. S. B.* 1886, p. 367; *de N. Butt. Ind.* iii, 1890, p. 145, pl. 26, fig. 182 ♂.

♂. *Upperside*: purple with a frosted silvery-blue sheen very much as in *N. macrophthalma*. Fore wing: a slender black anticiliary line. Hind wing: costal and dorsal margins somewhat broadly dull brown, an anticiliary black line as on the fore wing; the subterminal black spots in interspaces 1 and 2 of the underside apparent in most specimens by transparency. *Underside*: ground-colour and markings similar to those of *N. macrophthalma* but far more slender and more neatly defined. Antennæ, head, thorax and abdomen as in *macrophthalma*.— ♀. *Upperside*, fore wing: costa broadly, apex and termen still more broadly brown; a narrow edging of pale brown along the dorsal margin; rest of the wing grey, shot with iridescent blue in certain lights. Hind wing: pale brown, much paler than the brown on the fore wing; base very obscurely shot with iridescent blue; costal and dorsal margins brownish white; a transverse subterminal series of black spots edged inwardly and outwardly with slender white lines, two minute spots in interspace 1 geminate, that in interspace 2 large, these three crowned inwardly beyond the white edging with an additional dusky spot. *Underside*: very similar to that of the ♂, ground-colour paler, transverse white strigæ broader. Both ♂ and ♀ have the basal area of the fore wing within the transverse white strigæ lining the inner side of the discocellulars immaculate, as in *N. macrophthalma* and *N. kerriana*.

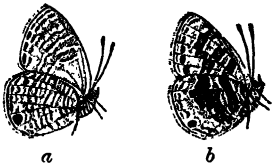

Fig. 85.
a. Nacaduba pavana. *b. Nacaduba cœlestis.*

Exp. ♂ ♀ 29–30 mm. (1·16–1·18″).

Hab. Sikhim; Bhutan; Assam; Cachar; Burma; Tenasserim; the Andamans. Described originally from Java.

741. **Nacaduba bhutea** (Pl. XX, fig. 147), *de N., J. A. S. B.* 1883, p. 72, pl. 1, fig. 13 ♂; *Elwes, Trans. Ent. Soc.* 1888, p. 387; *de N. Butt. Ind.* iii, 1890, p. 152.

♂. *Upperside*: dull opaque purplish-brown. Fore and hind wings: slender dark anticiliary lines, otherwise uniform. *Underside*: ground-colour similar but very much paler. Fore wing: transverse pale-edged fasciæ of a shade darker than the ground-colour as follows:—one across middle of cell from costa to median vein, another from costa over the discocellulars to lower apex of cell, a discal curved fascia from costa to vein 3, a spot below it shifted inwards; a transverse subterminal series of broad lunules of the same shade followed by a line of spots and an anticiliary slender line. Hind wing: a subbasal band, a short band along the discocellulars and a highly irregular somewhat contorted discal band, all similar in colour to those on the fore wing; terminal markings as on the fore wing, but the lunules of the subterminal series inwardly somewhat hastate, the row of spots beyond them each inwardly conical; a prominent black subterminal spot in interspace 2, inwardly ochraceous, outwardly speckled with metallic blue scales. Antennæ, head, thorax and abdomen dull purplish brown; beneath: thorax somewhat grizzled.—♀. Unknown.

Exp. ♂ 32 mm. (1·28″).

Hab. Sikhim.

742. **Nacaduba dana**, *de N.* (Nacaduba ?), *J. A. S. B.* 1883, p. 73, pl. 1, fig. 15 ♂; *id. Butt. Ind.* iii, 1890, p. 155.

♂. *Upperside*: from pale violet to dark bluish-purple. Fore and hind wings: comparatively broad, anticiliary brown lines widened slightly at apex of fore wing. Hind wing: in addition costal and dorsal margins narrowly paler and duller in colour; termen not furnished with a tail at apex of vein 2. *Underside*: dull hair-brown to ochraceous brown. Fore wing: two pairs of short, slender, transverse white strigæ, the inner pair from costa to median vein across middle of cell, the outer pair from costa along each side of the discocellulars stopping short at lower apex of cell; a transverse, discal, bisinuate, catenulated narrow band formed of a double series of slender white lunules followed by an inner and outer subterminal series of transversely elongate spots enclosed in or bordered on the inner and outer sides by obscure slender whitish lunules; lastly, a dark brown anticiliary line. Hind wing: crossed by the following slender white lunular lines:—two subbasal, two short lines near apex of cell, one on each side of the discocellulars, and two highly irregular, sinuous and broken on the disc; these are followed by some obscure lunular subterminal markings of dull white lines, in interspaces 1 and 2 by subterminal black spots, and a dark brown anticiliary line. Antennæ, head and abdomen dark brown, the shafts of the antennæ ringed with white; thorax bluish purple; beneath: the palpi and thorax with mixed black and white hairs, abdomen sullied white.—♀. *Upperside*: costa and termen very widely, dorsum very narrowly brownish, darkest on the apex; middle two-thirds of the wing from base white with iridescent blue scales; a transverse dark discocellular spot but no anticiliary dark lines. Hind wing: dusky brown, slightly bluish between the veins on basal half of wing. *Underside*: pale ochraceous white, markings similar to those in the ♂, but as they are dark ochraceous they show up more distinctly. Antennæ, head, thorax and abdomen dark brown; beneath: the palpi and thorax white, abdomen pale ochraceous.

Exp. ♂ ♀ 26–30 mm. (1·02–1·18″).

Hab. Kumaon to Sikhim; Bhutan; Bengal; Southern India: Nilgiris, Cochin; Chittagong; Upper and Lower Burma; Tenasserim.

A variable insect so far as the shade of the ground-colour is concerned, but like *N. hampsoni* the basal markings on the underside of the fore wing stop short at the median vein.

743. **Nacaduba hampsoni,** *de N., J. A. S. B.* 1885, p. 118, pl. 2, fig. 13 ♂; *id. Butt. Ind.* iii, 1890, p. 155.

♂. *Upperside*: pale brown flushed with shining purple. Fore and hind wings: the purple gloss not extended to the dorsum of the hind wing nor to the costal and terminal margins of either wing, all of which are narrowly edged with the pale brown of the ground-colour, beyond which along the termen of both wings are slender anticiliary lines. Cilia pale, their bases brown. *Underside*: dull brown. Fore wing: two short slightly crenulate lines transversely across the middle of cell and two similar lines along the discocellulars, followed by a transverse, irregular, catenulated, discal band slightly darker than the ground-colour and margined inwardly and outwardly by slender white lines; terminal markings: a subterminal line of spots similarly slightly darker than the ground-colour and margined with white lines; basal posterior half of wing below cell immaculate; finally, an anticiliary dark brown line. Hind wing: the following transverse, somewhat crenulate, slender white lines, between each pair of which the ground-colour is slightly darker:—an oblique pair at base, a pair along the discocellulars and a very irregular sinuous discal pair, the last dislocated at vein 6, the posterior portion curved and shifted outwards; these are followed by a subterminal inner and outer series of arrow-shaped lunules and an anticiliary dark line, this last with a very slender inner whitish edging; finally, a minute black spot near the termen in interspace 1 *a*, another similar spot in interspace 1 and a very much larger round black spot in interspace 2; all these spots touched with white on the inner side. Antennæ black, the shafts speckled with white; head, thorax and abdomen brown slightly purplish on the thorax and abdomen; beneath: palpi, thorax and abdomen dusky brownish-white.

♀. So far as I know not yet discriminated.

Exp. ♂ 28·mm. (1·11").

Hab. Recorded, so far as I know, from Mussoorie and the Nilgiri Hills only.

744. **Nacaduba atrata,** *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1828, p. 78; *Moore, Lep. Ceyl.* i, 1881, p. 89; *de N. Butt. Ind.* iii, 1890, p. 148; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 376, pl. 4, figs. 2, 2 *a*, larva & pupa.
Lycæna kurava, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 22.
Lampides prominens, *Moore, A. M. N. H.* (4) xx, 1877, p. 341; *id.* (Nacaduba) *Lep. Ceyl.* i, 1881, p. 88, pl. 37, figs. 3, 3 *a*–3 *c*, ♂ ♀, larva & pupa; *de N.* (Nacaduba) *Butt. Ind.* iii, 1890, p. 149.

♂. *Upperside*: pale dull violet with in certain lights a frosted silvery sheen; bases of wings suffused slightly with blue. Fore wing: a slender anticiliary dark brown line. Hind wing: costa broadly paler; dorsum brownish; in most specimens the subterminal spots in interspaces 1 and 2 show through by transparency from the underside, in a few these spots are marked by actual scaling; an anticiliary dark brown line as in the fore wing. *Underside*: brown. Fore wing: transversely traversed by three pairs of white strigæ, the innermost pair slightly curved, from subcostal vein to vein 1 across the middle of the cell; the inner striga of the medial pair complete, crosses on the inner side of the discocellulars from subcostal vein to vein 1, the outer striga beyond the discocellulars from vein 7 to vein 1, interrupted in interspace 5; the outer pair of strigæ are discal and cross from vein 7 to vein 3, the inner striga of the pair impinging at vein 3 on the outer striga of the medial pair; these are followed by an inner and an outer subterminal slender lunular line, a terminal series of slender transversely linear spots edged outwardly by a very slender white, and an anticiliary dark brown line. Hind wing: crossed by six or seven irregular, more or less broken, sublunular, white strigæ; terminal markings similar to those on the fore wing; interspace 1 with a minute, interspace 2 with a much larger round jet-black spot, both spots crowned inwardly with ochraceous orange and touched outwardly with glittering metallic blue scales. Antennæ black, the shafts obscurely speckled with white on the sides; head, thorax and abdomen purplish brown; beneath: the palpi fringed with black hairs, the thorax bluish white, abdomen white.—♀. *Upperside*, fore wing: costa above the cell, apex very broadly and a terminal edging that occupies about one-third of the length of the wing jet-black, this colour on the costa widened outwards; the remainder of the wing white shaded with dusky greyish which in certain lights has a beautiful metallic blue iridescence; on the inner side of the terminal edging is a transverse, very ill-defined,

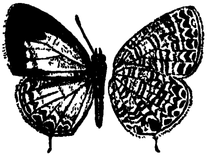
Fig. 86.
Nacaduba atrata, ♀.

diffuse dusky band, and enclosed between it and the black edging three somewhat prominent spots of the white ground-colour. Hind wing: costal margin above a longitudinal line through the middle of the cell dusky black; posterior portion of the wing dusky bluish, veins prominently black; a comparatively well-defined transverse postdiscal series of black lunules edged inwardly and outwardly by similar series of white lunules, followed by a subterminal series of black spots with an outer edging of white and an anticiliary jet-black line; the subterminal spots decrease in size anteriorly, those in interspaces 2 and 3 the largest, the two spots in interspace 1 minute and geminate; tail black tipped with white. *Underside*: similar to that of the ♂ but the ground-colour grey with a slight tint of brown, the transverse white strigæ much broader, somewhat diffuse; on the fore wing the band formed by the medial pair of strigæ much more broken than in the ♂, the posterior portion below vein 3 shifted well outwards; on the hind wing the subterminal black spot in interspace 2 comparatively very large and prominent. Antennæ as in the ♂; head, thorax and abdomen brown; beneath: the palpi, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 30–32 mm. (1·18–1·27″).

Hab. Sikhim; Bhutan; Southern India: the Nilgiri and Shevaroy Hills; Ceylon; Assam; Cachar; Burma; Tenasserim; the Nicobars; extending to the Malay Peninsula and Java.

I have a single specimen from the Nicobars which is very much larger (*expanse* 37 mm.). This has the ground-colour considerably darker on the upperside, with the frosted silvery-blue sheen more prominent than in typical *atrata*, which latter it closely resembles on the underside.

Larva. "Feeds on *Embelia robusta* . . . . the back elevated and the segments most distinctly defined; the anal segment is flattened; the back forms a distinct ridge, the colour is green but there is a purple line along the ridge of the back; the other segments are also edged with the same colour. The head is small, amber coloured, with a darker border." (*Davidson, Bell & Aitken.*)

Pupa. "Short and stout, constricted slightly between the thorax and abdomen and has slight traces of a ridge along the back. In colour it is a dingy greenish-brown powdered with black. There is an interrupted dark band along the middle of the back and also spots of blackish on the abdominal segments and just beyond the wing-covers and the sides of the thorax. It is smooth and only fastened at the tail parallel with the leaf to which it is attached." (*Davidson, Bell & Aitken.*)

745. **Nacaduba plumbeomicans**, *Wood-Mason & de N., J. A. S. B.* 1880, p. 231; *Moore, Journ. Linn. Soc., Zool.* xxi, 1886, p. 40; *de N. Butt. Ind.* iii, 1890, p. 150.

Race nicobarica.

Nacaduba plumbeomicans, *var.* nicobaricus, *Wood-Mason & de N., J. A. S. B.* 1881, p. 234; *de N. Butt. Ind.* iii, 1890, p. 151.

♂. *Upperside*: dull purplish-blue, in certain lights with a shining plumbeous frosting. Fore and hind wings: black anticiliary lines and on the hind wing the black subterminal spot in interspace 2 on the underside apparent by transparency. *Underside*: purplish grey. Fore wing: a pair of curved white lines from costa transversely across the cell to vein 1, a short similar line on the inner side of the discocellulars followed by three transverse discal similar lines from costa to vein 1, an inner and outer transverse subterminal series of slender white lunules and an anticiliary dark brown line. Hind wing: crossed transversely by three slender broken lines, with a short line on the inner side of the discocellulars between the outer two; these are followed by a discal and a postdiscal less broken and interruped similar lines, a double series of slender white lunules and a dark anticiliary line as on the fore wing. Cilia of both fore and hind wings dark brown. Antennæ black, the shafts obscurely speckled with white; head, thorax and abdomen brown, thorax and abdomen slightly purplish; beneath: palpi white fringed with long black stiff hairs, thorax and abdomen purplish grey.—♀. *Upperside*: fuscous brown, the veins prominent; an elongate oval medial patch extended from base outwards on fore wing for about two-thirds of its length, dull brownish-white brilliantly iridescent with metallic blue in certain lights. Hind wing: a postdiscal transverse series of slender detached white lunules, followed by a similar subterminal series of continuous lunules that encloses between it and a slender terminal white line a transverse series of black spots; these spots decrease in size anteriorly; lastly a conspicuous anticiliary black line. *Underside*: pale ochraceous-brown; markings much as in the ♂, but of the transverse white lines that cross the disc of the fore wing the outer one is shorter, not extended below vein 3. Antennæ, head, thorax and abdomen as in the ♂, but the head, thorax and abdomen paler with no purple gloss.

Exp. ♂ ♀ 28–31 mm. (1·11–1·25″).

Hab. Tenasserim: Mergui; Assam; Chittagong hill-tracts; the Andamans and Nicobars.

Race **nicobarica,** Wood-Mason & de N.—♂. *Upperside*: ground-colour darker, plumbeous effulgence more striking. *Underside*: very dark purplish-brown; markings in form and arrangement much as in the ♀ of the typical form, but the transverse bands formed by the white lines much broader; on the hind wing the black subterminal spots in interspaces 1 and 2 much larger, conspicuously crowned inwardly and surrounded with ochraceous orange and with an outer bordering of metallic green scales; the anticiliary black line edged inwardly over the tornal area with white. Antennæ, head, thorax and abdomen as in the typical form.—♀. Closely resembles the typical form, but differs as follows:—*Upperside*: fuscous black, the ground-colour much darker than in the typical form; the pale medial patch on the fore wing shot in certain lights with iridescent blue, much larger, occupying the basal posterior two-thirds of the wing, and unlike the typical form the posterior two-thirds of the hind wing. *Underside*: precisely as in the typical form. Antennæ, head, thorax and abdomen also similar to those of the typical form.

Exp. ♂ ♀ 30–32 mm. (1·18–1·27″).

Hab. Great Nicobar and Central Group, Nicobar Islands.

746. **Nacaduba ardates,** *Moore* (Lycæna), *P. Z. S.* 1874, p. 574, pl. 67, fig. 1; *id. Lep. Ceyl.* i, 1881, p. 90, pl. 38, figs. 2, 2 *a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 153, pl. 27, fig. 185 ♂ tailless form (? noreia).

? Lycæna nora, *Felder*, *Sitzungsber. Ak. Wiss. Wien*, xl, 1860, p. 458; *id. Novara Reise*, *Lep.* ii, 1865, p. 275, pl. 34, fig. 34; *de N.* (Nacaduba) *Butt. Ind.* iii, 1890, p. 147.

♂. *Upperside*: purplish-brown or purplish with a dark tint, some specimens brown with a very slight purplish sheen seen only in certain lights. Fore and hind wings: nearly uniform, both with slender black anticiliary lines, the hind wing in addition with the costal and dorsal margins paler; in most specimens with a subterminal black spot in interspace 2, sometimes seen only by transparency from the underside; tail black tipped with white. *Underside*: brown, hoary, brownish or pale dull brown. Fore wing: a subbasal pair of transverse white strigæ, a shorter pair along the discocellulars and a discal pair; these strigæ all narrowly edged on the inner sides of each pair with fuscous which gives the appearance of transverse bands somewhat darker than the ground-colour; the subbasal pair extend from vein 1 to vein 12, the discocellular pair from upper to lower apex of cell and the discal pair are very irregular and dislocated at each vein, the whole having the appearance of a dark sinuous band; terminal markings often very faint and ill-defined or again fairly prominent and consisting of a double subterminal series of transversely linear, sometimes lunular, dark spots, with edgings paler than the ground-colour; lastly, an anticiliary dark line. Hind wing: with transverse pairs of white, inwardly fuscous-edged strigæ similar to those on the fore wing, but even more irregular and broken; the subbasal pair extended from costa to vein 1, below which the dorsal area is whitish, the discocellular pair extend from the costa and posteriorly coalesce with the discal pair which are as irregular and dislocated as in the fore wing; terminal markings similar to those on the fore wing, but the double subterminal series of dark spots more lunular and a prominent round black subterminal spot crowned with ochraceous in interspace 2. Antennæ, head, thorax and abdomen dark brown; the shafts of the antennæ speckled with white; beneath: the palpi fringed with black, thorax dark greyish-brown, abdomen white.—♀. *Upperside*: brownish purple, sometimes fuscous. Fore and hind wings: as in the ♂ with anticiliary dark lines, but differ as follows:—Fore wing: an iridescent bluish sheen from base outwards to disc; hind wing:

a slender more or less prominent white line edging the anticiliary black line on the inner side, a subterminal geminate double black spot in interspace 1 and a similar larger single spot in interspace 2. *Underside*: ground-colour paler and brighter than in the ♂, the markings similar but more neatly and generally more clearly defined; both fore and hind wings in most of the specimens that I have seen with a white terminal line before the anticiliary dark line. Antennæ, head, thorax and abdomen much as in the ♂.

Exp. ♂ ♀ 20–25 mm. (0·78–1·00″).

Hab. Peninsular India from the outer Himalayas to Travancore, avoiding the desert tracts; Ceylon; Assam; Burma; Tenasserim; the Andamans and Nicobars; extending into the Malayan Subregion to the Philippines.

This form is most variable both in the shade of the ground-colour and in the exact shape of the markings. In females from the Andamans the ground-colour on the underside of the wings seems always to be a rich golden ochraceous. I have also seen specimens of the female from Continental India, Assam and Burma with the ground-colour of the same shade. The markings on the underside in these specimens are always narrower, neater, more clearly defined, and the pairs of white lines instead of being edged on the inner sides of each pair by fuscous are margined by black lines. Also certain specimens from Sikhim, from Ceylon and from the Andamans resemble very closely, both in the ground-colour and markings of the underside, the figure of *N. nora*, Felder, on plate xxxiv, fig. 34, of the 'Novara Reise' volume on the Lepidoptera. I believe Felder's species is simply a variety of *N. ardates*. I have not however, seen the unique specimen from the Andamans, identified by de Nicéville (*l. c.*) as *N. nora*, Felder.

With regard to *Nacaduba noreia*, Felder, the form next described, the late Mr. de Nicéville (see Jour. Bomb. N. H. Soc. x, 1895, p. 36) in enumerating the forms of *Nacaduba* that occur in Sumatra made the following remarks:—"Of all these, the only one that presents any difficulty in identification is *N. noreia*. That species has no tail, and I have always considered it to be a dimorphic form in both sexes of *N. ardates*, Moore. I have both sexes of the latter from Sumatra, but of *N. noreia* only males, unless, as I believe, its female has to be found in a very curiously marked little butterfly which I possess in considerable numbers, all the specimens being obviously females." On plate S. fig. 24 of the same volume Mr. de Nicéville figured one of these females. It certainly is "a very curiously marked little butterfly" and I doubt its being a *Nacaduba* at all; it cannot possibly be the ♀ of *Nacaduba noreia*, Felder, for the type as described was according to its author a ♀, and Felder's description does not agree with de Nicéville's at all. Again the tailless form of *N. ardates* cannot be Felder's insect because the inner pair of white lines on the underside of the fore wing in the latter do not, according to

Felder, extend below the median vein. In the tailless form of *N. ardates*, on the contrary, these inner white strigæ extend well below the median vein just as they do in the tailed form. I have been unable to identify *N. noreia*, Felder, and therefore quote the original description as translated by de Nicéville.

747. **Nacaduba noreia,** *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien*, xviii, 1868, p. 282; *de N. Butt. Ind.* iii, 1890, p. 148.

"♂ ♀. A geographical form of *L.* (=*N.*) *nora*, Felder, but with the external margin less convex in the fore wing. *Upperside*: both wings brownish fuscous. Fore wing with the interno-basal patch subtriangular. Hind wing with the basal patch violaceous blue, the marginal spots more obscure, the usual extra-caudal one excepted, very obsolete. *Underside*: both wings hoary fuscescent; a discocellular spot (in the hind wing rather narrow), a chain-shaped fascia beyond the middle once broken with an antico-basal fasciole, on the fore wing not going beyond the median nervure, and a basal fascia on the hind wing composed of four spots and within it an anterior incomplete spot fuscous, circled with whitish filled up with the ground-colour, with somewhat fuscous marginal spots (in the hind wing more triangular), the extra-caudal one larger and the minute black anal pair on the hind wing excepted, circled with whitish, set upon concolorous spots, lunate in the fore wing and sagittate in the hind wing, with a fuscous marginal line and a whitish line before the cilia cut through by fuscous spots at the tips of the veins." (*Felder.*)

Exp. Not given.

Hab. Ceylon.

"Said to have been taken at Newarra Ellia at about 6000 ft. on the 24th December, 1864." (*de Nicéville.*)

748. **Nacaduba cœlestis,** *de N., J. A. S. B.* 1886, p. 366, pl. 17, fig. 11; *de N. Butt. Ind.* iii, p. 151, pl. 27, fig. 184 ♂.

♂. *Upperside*: shining bluish with a purple flush in certain lights. Fore and hind wings: termen narrowly edged with fuscous black on which the jet-black anticiliary line on each wing is obscurely visible, the edging of fuscous black slightly widened anteriorly. *Underside*: dusky brown. Fore wing: a transverse, subbasal, broad, dark, brownish-black, white-margined band from the subcostal to vein 1, a similar band along the discocellulars also extended to vein 1, an upper discal similar band from costa, curved a little outwards and stopping short at vein 3, followed by a postdiscal transverse series of dark spots which on the inner side are comparatively broadly, on the outer side very slenderly edged with white; succeeding which is a subterminal extremely slender series of transversely linear spots, a white line and a jet-black anticiliary line; cilia brown. Hind wing: three transversely arranged dark brownish-black spots; transverse similarly coloured subbasal and discal bands, both bands inwardly and outwardly edged with slender white lines and the discal band greatly and irregularly widened in the middle, where superposed on the dark background is a snow-white transverse spot; beyond these are a postdiscal series of comparatively broad white lunules, a subterminal very slender white lunular line, a terminal white thread and a jet-black slender anticiliary line; cilia shining silky brown; tail brown tipped with white. Antennæ black, the shafts obscurely speckled with white; head black; thorax and abdomen bluish; beneath: palpi with blackish fringe, thorax and abdomen whitish.

The female has still to be discovered.

Exp. ♂ 27–30 mm. (1·10–1·18″).

Hab. Himalayas: from Kumaon to Sikhim, 2000 to 4000 feet; Assam; Upper Burma; South Andamans.

749. **Nacaduba hermus**, *Felder* (Lycæna), *Sitzungsber. Ak. Wiss. Wien*, xl, 1860, p. 457.

Lampides viola, *Moore, A. M. N. H.* (4) xx, 1877, p. 340; *id.* (Nacaduba) *Lep. Ceyl.* i, 1881, p. 89, pl. 38, figs. 1, 1*a*, 1*b*, ♂ ♀; *Distant* (Nacaduba), *Rhop. Malay.* 1884, p. 219, woodcut, pl. 20, fig. 24 ♂; *de N.* (Nacaduba) *Butt. Ind.* iii, 1890, p. 146, pl. 27, fig. 113 ♂.

Lycænesthes merguiana, *Moore, J. A. S. B.* 1884, p. 23.

♂. *Upperside*: dark purplish-brown. Fore and hind wings: slender black anticiliary lines; hind wing in addition with two black subequal subterminal spots, one in interspace 1, the other in interspace 2, both these spots edged outwardly by a silvery white thread; tail black tipped with white. *Underside*: hoary brown. Fore wing: transverse bands of the ground-colour defined by very slender, short, white lunular lines as follows:—a band across middle of cell extended from the subcostal vein to vein 1, a short band defining and enclosing the discocellulars and a bisinuate discal band extended from veins 1 to 7; succeeding these are an inner and an outer subterminal series of transversely elongate spots somewhat darker than the ground-colour and a slender black anticiliary line; each row of the subterminal series of spots is obscurely bordered inwardly and outwardly with whitish. Hind wing: transverse bands of the ground-colour enclosed and defined as on the fore wing by short slender lunular lines of white as follows:—a subbasal band across cell, another at apex of cell extended from vein 8 to vein 1, thence abruptly contorted upward and terminating on the dorsal margin; a discal band very irregular and sinuate from vein 8 to vein 1, thence bent upwards to dorsum; beyond these an inner and an outer subterminal series of white lunules, the inner series obscure, of the outer series the lunules in interspaces 1, 2, and 3 very prominent; interspace 1 with two minute geminate black subterminal spots, interspace 2 with one large round black similar spot crowned inwardly with ochraceous and irrorated outwardly with a few metallic blue scales; a very slender terminal white line not extended to the apex and an anticiliary dark line. Antennæ black, shafts minutely ringed with white; head, thorax, and abdomen dark brown; beneath: the palpi fringed with black hairs, thorax fuscous, abdomen dull white.—♀. *Upperside*: dull leaden blue. Fore and hind wings: anticiliary slender black lines as in the ♂, within which on the fore wing is an obscure transverse subterminal series of black spots; on the hind wing a very slender terminal white line, a subterminal row of black spots and a postdiscal series of white lunules, the spots decreasing in size and the lunules obsolescent anteriorly. *Underside*: ground-colour paler than the markings, more obscure but identical with those of the ♂. Antennæ, head, thorax and abdomen as in the ♂ but all paler in colour.

Exp. ♂ ♀ 26–28 mm. (1·02–1·11″).

Hab. Sikhim; Southern India: the Nilgiris; Ceylon; Assam; Burma; Tenasserim; Andamans.

An easily discriminated and very distinct form. ♂. Fore wing: apex very acute; termen very nearly straight. Hind wing: posteriorly compressed and slightly elongate; termen very straight; apex and tornal angle both very well marked.

750. **Nacaduba ancyra**, *Felder* (Lycæna), *Sitzungsber. Akad. Wiss. Wien*, xl, 1860, p. 458; *id Novara Reise, Lep.* ii, 1865, p. 276, pl. 34, fig. 5 ♂.
Nacaduba aberrans, *Elwes, P. Z. S.* 1892, p. 626, pl. 44, fig. 6 ♂.

♂. *Upperside*: plumbeous blue. Fore and hind wings: anticiliary jet-black lines; on the hind wing subterminal subequal black spots in interspaces 1 and 2, beyond which there is a terminal white thread that does not extend beyond those two interspaces. *Underside*: french-grey; principal markings chalky-white, somewhat diffuse. Fore wing: a pair of short transverse white lines across the middle and another pair at the apex of cell, one on each side of the discocellulars, these latter not extended to the apex but in most specimens indicated there by two white spots; a complete transverse catenulated discal band composed of two parallel white lines, beyond which the ground-colour looks as if it had been chalked over; the terminal markings however, though blurred consist of an inner and an outer transverse series of white lunules succeeded by an anticiliary white line. Between the transverse pairs of white lines, medial and discal, and between the subterminal series of lunules, the ground-colour is distinctly darker, between the latter and the anticiliary line it takes the appearance of an incomplete transverse row of dark spots. Hind wing: the following transverse white, somewhat indistinct lines:—two basal, a single line on the inner side of the discocellulars, two irregular and discal, followed by double series of white lunules; a white anticiliary line and subterminal row of dark spots as on the fore wing; subterminal black spots, broadly margined on the inner side with ochraceous orange in interspaces 1 and 2; tail black tipped with white. Antennæ, head, thorax and abdomen dusky brown, the shafts of the antennæ speckled with white; thorax and abdomen suffused with blue; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: fuscous black. Fore wing: posterior two-thirds pinkish brown shot with iridescent blue; a jet-black anticiliary line; cilia dark brown. Hind wing: basal three-fourths shot with a duller paler blue than on the fore wing; very obscure postdiscal series of slender pale lunules, followed by the dark ground-colour and beyond it by a subterminal series of slender lunules, those in the interspaces 1 and 2 ochraceous orange, the others white; a series of jet-black spots, a slender terminal white line and a conspicuous jet-black anticiliary line; cilia white alternated with dark brown at the apices of the veins. *Underside*: similar to that of the ♂, but the ground-colour paler, the markings, especially the terminal markings, more clearly defined. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 30–32 mm. (1·18-1·27″).

Hab. The hills of Assam, Burma, and Tenasserim; the Nicobars.

The termen of the hind wing in the ♂ is less convex than in other forms of *Nacaduba* except perhaps in *N. hermus*, Felder. The insect, as Mr. Doherty remarks, "looks very like a *Catochrysops*."

Genus **LAMPIDES**.

Lampides, *Hübner, Verz. bek. Schmett.* 1816, p. 70; *Moore, Lep. Ceyl.* i, 1881, p. 94; *de N. Butt. Ind.* iii, 1890, p. 159.
Jamides, *Hübner, Verz. bek. Schmett.* 1816, p. 71; *Moore, Lep. Ceyl.* i, 1881, p. 86; *de N. Butt. Ind.* iii, 1890, p. 156.

Type, *L. celeno*, Cramer, from India.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa widely arched; apex acute but not produced; termen slightly convex, nearly straight; tornus bluntly angular; dorsum straight, long, about four-fifths the length of the costa; cell about half length of wing; vein 7 from before apex of cell, upper discocellular therefore in line with and forming part of subcostal vein; middle and lower discocellulars subequal, middle straight, lower slightly concave: vein 3 from before lower apex of cell; vein 8 absent, vein 9 from middle of 7; veins 10 and 11 free, from apical half of subcostal; vein 12 terminates on costa not opposite to but well before apex of cell; the latter two veins bent inwards towards each other close to base of 11 and joined by a short bar. Hind wing: costa slightly curved; apex rounded;

termen slightly convex and perceptibly, but very obtusely, angulate at apex of vein 2; tornus well marked; dorsum straight. Antennæ about half length of fore wing, club spindle-shaped, long and gradual; eyes hairy; palpi densely clothed with scales beneath, not fringed with hairs, third joint long (except in *L. bochus* which has the palpi comparatively short); body slender.

The genus *Jamides* retained by many authors can only at the best be separated as a subgenus, the third joint of the palpus is notably shorter in proportion but the venation of the wings is the same as in *Lampides.*

Key to the forms of Lampides.

♂♂.

A. Underside fore wing: fourth transverse white fascia from base ends on vein 3.
  a. Upperside: rich deep blue, metallic and shining.
    a'. Upperside fore wing: terminal fourth at least velvety black.
      a². Blue colour on basal half of wing not extended up to costal margin .... *L. bochus*, p. 398.
      b². Blue colour on basal half of wing extended right up to costal margin .. *L. bochus*, race *nicobaricus*, p. 398.
    b'. Upperside fore wing: much less than terminal fourth black; black edging frequently reduced to a slender black line .... *L. coruscans*, p. 400.
  b. Upperside: pale blue or purplish-blue or pale purplish, metallic and shining.
    a'. Underside fore and hind wings: subterminal transverse white fasciæ lunular; fore wing: third fascia from base broken and interrupted on vein 4 .... *L. lacteata*, p. 401.
    b'. Underside fore wing: subterminal transverse white fasciæ straight, not lunular, third fascia from base vertical, unbroken, from just below costa to vein 1; hind wing: subterminal fasciæ highly lunular, sagittate .... *L. subdita*, p. 402.
  c. Upperside: milk-white, slightly bluish, not metallic.
    a'. Upperside fore wing: terminal black edging very slender, sometimes towards apex with an inner series of transversely linear black spots .... *L. pura*, p. 403.
    b'. Upperside fore wing: terminal black edging distinctly broader.
      a². Upperside fore and hind wings: without postdiscal transverse fuscous bands .. *L. celeno*, p. 404.
      b². Upperside fore and hind wings: with postdiscal transverse fuscous bands .. *L. celeno*, race *kinkurka*, p. 406.

B. Underside fore wing: fourth transverse white fascia from base ends on vein 4.
  a. Upperside fore wing: termen distinctly, in some specimens comparatively broadly, edged with black; interspaces near their apices without fuscous fine striolæ.
    a'. Upperside hind wing: generally with a more or less complete transverse subterminal series of black spots; underside fore wing: second transverse white fascia from base generally unbroken .... *L. elpis*, p. 407.
    b'. Upperside hind wing: always without a transverse subterminal series of black spots, except in interspaces 1 *a*, 1 and 2; underside fore wing: second transverse white fascia from base always interrupted at vein 3 .... *L. elpis*, var. *kankena*, p. 408.
  b. Upperside fore wing: termen with an anticiliary black line and on its inner side fine, inwardly directed, fuscous striolæ in each interspace .... *L. kondulana*, p. 409.

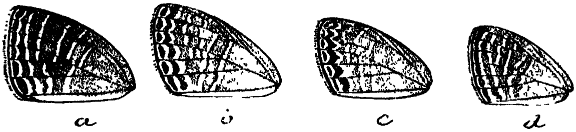

Fig. 87.

a. *L. celeno*, underside fore wing.
b. *L. lacteata*, " "
c. *L. coruscans*, " "
d. *L. elpis*, " "

751. **Lampides bochus**, *Cramer* (Papilio), *Pap. Exot.* iv, 1782, p. 210, pl. 391, figs. C, D; *Hübner* (Jamides) *Verz. bek. Schmett.* 1816, p. 71; *Moore* (Jamides), *Lep. Ceyl.* i, 1881, p. 86, pl. 36, figs. 8, 8 *a*, ♂ ♀; *de N.* (Jamides) *Butt. Ind.* iii, 1890, p. 157; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 377.

Race nicobaricus.

Lampides plato, *var.* nicobaricus, *W.-M. & de N., J. A. S. B.* 1881, p. 234.

Jamides bochus, *race* nicobaricus, *de N. Butt. Ind.* iii, 1890, p. 158, pl. 27, fig. 186 ♂.

♂. *Upperside*, fore wing: velvety jet-black; base deep blue, beautifully metallic and shining, measured on the dorsum this colour occupies three-fourths of its length from base, its outer margin then curves upwards just past the apex of the cell, enters into the bases of interspaces 10, 11 and 12 and fills the whole of the cell. Hind wing: costal margin above subcostal vein and vein 7, and dorsal margin narrowly fuscous black, a medial longitudinal pale streak on the former; terminal margin narrowly edged with velvety black, inside which in interspaces 1 and 2 is a slender transverse whitish line, with an elongate irregular transverse black spot above it in interspace 1 and a more obscure similar spot in interspace 2; traces of such spots also are present in some specimens in the anterior interspaces. Cilia of both fore and hind wings black; filamentous tail at apex of vein 2 black tipped with white. *Underside*: dark chocolate-brown. Fore and hind wings; transversely crossed by the following very slender white lines all more or less broken into short pieces:—Fore wing: a short pair one on each side of and parallel to the discocellulars, a pale streak along the discocellulars themselves; a single line in continuation of the outer of the discocellular lines, extends down to vein 1; an upper discal pair of lines that form a more or less catenulated short band extend from the costa to vein 3, the inner line of the two continued to vein 1; two more obscure subterminal and a single terminal line, the area enclosed between the subterminal lines and between them and the terminal line darker in the interspaces, giving the appearance of two obscure subterminal lines of spots edged inwardly and outwardly by white lines. Hind wing: crossed by nine very broken and irregular lines; tracing them from the costa downwards their middle short pieces are found to be shifted outwards and a few are short and not complete, the inner two are posteriorly bent abruptly upwards, the subterminal two are lunular and the terminal line nearly continuous; posteriorly between the subterminal pair of lines in interspace 1 there is a small black spot inwardly edged with dark ochraceous, and in interspace 2 a much larger round black spot, both black spots are touched with metallic blue scales. Antennæ, head, thorax and abdomen black, the shafts of the antennæ speckled with white; beneath: palpi, thorax and abdomen narrowly white down the middle.—♀. Similar to the ♂ generally but with the following differences:—*Upperside*, fore wing: ground-colour fuscous opaque black, not velvety black, blue basal area more restricted and not so deep a blue nor at all metallic. Hind wing: the black costal and terminal margins very much broader, the blue on the basal area consequently much restricted and of the same shade as the blue on the fore wing; terminal margin with a subterminal anteriorly obsolescent series of spots of a shade darker than that of the terminal black area on which they are superposed; these spots posteriorly more or less distinctly encircled with slender lines of bluish white, anteriorly these lines are almost obsolete. Cilia of both fore and hind wings and the filamentous short tail as in the ♂. *Underside*: similar to that of the ♂ but the ground-colour generally paler and duller; the transverse white lines broader and more clearly defined. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 34–38 mm. (1·24–1·48″).

Hab. Peninsular India, but not in the very dry or desert tracts; Ceylon; Assam; Burma; Tenasserim; the Andamans; extending in the Malayan Subregion to Australia.

Messrs. Davidson, Bell and Aitken say:—“The larva which we have taken at Karwar in June is hardly distinguishable from that of *Catochrysops pandava*, Horsfield; it is, however, covered with minute hairs and is generally of an olive-green colour and without the reddish suffusion so generally noticed in *C. pandava.* The pupa is indistinguishable from that of *C. pandava.* The larva feeds on *Xylia dolabrifornis*, and also on the flowers of *Butea frondosa.*"

Race **nicobaricus**, W.-M. & de N.—A slightly differentiated insular race. Differs from the typical form in the ♂, by the greater extension on the upperside of the metallic blue colour on the fore wing, the outer margin of which instead of curving round close to the apex of the cell extends well beyond it and almost up to the costal margin anteriorly; on the hind wing the narrow black margin of the typical form is replaced by a margin that is comparatively broad at the tornal angle, but diminishes in width anteriorly; along the dorsum it is restricted to the basal half of interspace 1.— ♀. *Upperside*: differs from typical *bochus* ♀ in the smaller areas of blue on both fore and hind wings, that colour is also generally paler and more purplish. *Underside*: in both sexes and the antennæ, head, thorax and abdomen as in the typical form.

Exp. ♂ ♀ 30–32 mm. (1·18–1·27″).

Hab. The Central Group of the Nicobar Islands; also Great Nicobar.

De Nicéville gives also the Andamans, but all the specimens I have seen from there have been typical *bochus.*

752. **Lampides coruscans**, *Moore, A. M. N. H.* (4) xx, 1877, p. 341; *id. Lep. Ceyl.* i, 1881, p. 96, pl. 36, figs. 9, 9 *a*, 9 *b*, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 163.

♂. *Upperside*: cobalt-blue, shining and metallic, with in certain lights a purplish, in others a greenish tint. Fore wing: slightly and very narrowly fuscous at apex, with a very slender terminal black line; cilia brownish black. Hind wing: a subterminal series of transverse small black spots in the interspaces, in most specimens very slenderly edged paler, in some edged similarly with silvery white; an anticiliary slender black line as on the fore wing; cilia greyish brown, their basal halves white; filamentous tail at apex of vein 2 black tipped with white. *Underside*: pale greyish-brown. Fore and hind wings: transversely crossed by the following slender white fasciæ or lines:—Fore wing: the arrangement of the lines almost as in *L. bochus*, *i. e.* a discocellular pair, the outer one continued to vein 1, an upper discal pair (more broken than in *bochus*), the inner one continued to vein 1; of the terminal markings the subterminal pair of transverse lines are highly lunular, the inner one sometimes broadly diffuse. Hind wing: markings as in *L. bochus* but more prominent, the subterminal pair of lines highly lunular; the subterminal black spot in interspace 2 larger. Antennæ black, the shafts more obscurely speckled with white than in *bochus*; head, thorax and abdomen brown, thorax and abdomen above bluish; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: very similar to that of *L. bochus* ♀, but in the fore wing the blue colour extends right up to the costa in its basal half, the outer margin of the blue area starting from the dorsum at three-fourths of its length from the base, runs parallel to the termen up to vein 3, thence obliquely inwards to the middle of the costa. Hind wing: similar to the hind wing of *L. bochus*, but the blue tint paler. *Underside*: ground-colour more brownish; markings on both fore and hind wings precisely similar to those of the ♂.

Exp. ♂ ♀ 30–37 mm. (1·18–1·44″).

Hab. Ceylon.

753. **Lampides lacteata,** *de N. Journ. Bomb. N. H. Soc.* x, 1895, p. 36, pl. S, figs. 25, 26, ♂ ♀.
Lampides pseudelpis, *Moore* (*nec Butler*), *Lep. Ceyl.* i, 1881, p. 95; *de N.* (*nec Butler*) *Butt. Ind.* iii, 1890, p. 165.

♂ ♀. Closely resembles *L. elpis*, Godart, of which form I think it may be an occasional variation. I have only seen the type pair and a pair in my own collection, the ♂ from Nalanda and the ♀ from Kandy, collected by Mr. E. E. Green and kindly sent to me. Mr. de Nicéville in describing the form also said: "*L. lacteata* seems to be a rare species. I possess two pairs only from Ceylon."

♂. *Upperside*: a uniform pale purplish blue slightly paler than in *L. elpis*. Fore and hind wings: very slender black anticiliary lines. Fore wing: narrowly fuscous at apex; hind wing: a very slender terminal white thread before the anticiliary black line and a small black subterminal spot in interspace 1 edged inwardly with white, above which is a very obscure, short, transverse fuscous line. Cilia of both wings brown, with on the hind wing a white line at the base; tail black tipped with white. *Underside*: pale uniform greyish brown; discal and inner markings on both fore and hind wings almost identical with those of true *elpis*, and precisely similar to those in many varieties from Sikhim and Assam, of that form. Terminal markings on both wings differ only in *the two transverse subterminal white lines which are lunular and not straight.* On the hind wing these lines are not however, nearly so prominently made up of lunules as in *L. subdita*, the form next described. Antennæ, head, thorax and abdomen as in *L. elpis*.—♀. Still more closely resembles the same sex of *elpis*, but the ground-colour on the upperside is nearly white suffused with purplish blue towards the base of the wings and the black area on the apex and terminal margin is very broad. On the underside the markings are as in its own ♂.

Exp. ♂ ♀ 34–39 mm. (1·36–1·55″).

Hab. Ceylon.

In the pair sent me by Mr. Green and mentioned above, the tint of blue on the *upperside* is precisely the same as that in the

♂ and ♀ of true *elpis*; but on the underside the subterminal pair of lines on both fore and hind wings are as in the type ♂ and ♀ of *lacteata*.

754. **Lampides subdita,** *Moore, Journ. Linn. Soc., Zool.* xxi, 1886, p. 41; *de N. Butt. Ind.* iii, 1890, p. 166.

♂. *Upperside*: very pale purplish or lilac; the markings of the underside show through by transparency. Fore wing: an anticiliary, very slender, fuscous-black line continued along the apical half of the costal margin and also for about the apical third of the dorsal margin. Hind wing: two parallel subterminal transverse fuscous lines in interspace 1 *a*, single similar lines in interspaces 1 and 2; in interspace 1 ending in a round black dot anteriorly, in interspace 2 in similar dots anteriorly and posteriorly. *Underside*: greyish brown of a rather dark shade. Fore wing: crossed by seven transverse delicate white fasciæ; the first from base extends between subcostal vein and vein 1 on the inner side of the discocellulars and is interrupted on the median vein; the second short, just beyond the discocellulars from vein 4 to vein 6; the third from just below the costa to vein 1 uninterrupted, almost vertical; the fourth from just below the costa to vein 4, parallel to vein 3; the three beyond these from just below costa to dorsum, the middle one slightly lunular towards the apex in a few specimens; the two bands of the ground-colour enclosed between the three lines, of a slightly darker shade than the rest. Hind wing: crossed by nine fasciæ similar to those on the fore wing; the first pair from base faintly defined, broken on the subcostal vein; the second and third pairs extend from costa to dorsum and are more widely separated anteriorly than posteriorly where they are abruptly bent upwards before reaching the dorsum; the fourth or subterminal pair, which are highly lunular, sagittate, enclose between them and between the outer line of the pair and the ninth or terminal white line two series of fuscous-black spots, the spots of the inner series triangular, of the outer series lunate; these series are interrupted in interspace 2 by a large round deeper black spot crowned inwardly by a broad ochraceous edging, and in interspace 1 by a similar but much smaller spot, both these are jet-black touched with metallic bluish-green scaling. Cilia of both fore and hind wings pale greyish brown; tail black tipped with white. Antennæ, head, thorax and abdomen brownish black, the shafts of the antennæ speckled with white, the thorax and base of abdomen bluish; beneath: palpi and thorax white, abdomen with a medial line of the same colour.— ♀. *Upperside*: ground-colour similar to that of the ♂. Fore wing: terminal margin broadly black, the black area commences on the apical third of the costa and gradually narrows to the tornus, its inner margin curved. Hind wing: above the subcostal vein and vein 6 fuscous; a subterminal series of white black-centred spots edged inwardly by a postdiscal series of lunules and outwardly by an anticiliary black line. *Underside*:

precisely as in the ♂. Cilia of both fore and hind wings white; a filamentous short tail at apex of vein 2 on the hind wing. Antennæ, thorax and abdomen similar to those in the ♂.

Exp. ♂ ♀ 33-35 mm. (1·30-1·38″).

Hab. Tenasserim.

755. **Lampides pura,** *Moore, Journ. Linn. Soc., Zool.* xxi, 1886, p. 41; *de N. Butt. Ind.* iii, 1890, p. 170, frontispiece, fig. 132, ♀ dry-season form.

♂. *Upperside*: bluish white slightly more metallic and shining than in *L. celeno*. Fore and hind wings: the markings of the underside show through by transparency; both wings with slender anticiliary black threads, edged obscurely on the inner side on the fore wing by a series of small black dots that posteriorly are more or less obsolete, and on the hind wing by an ill-defined white line. *Underside*: ground-colour variable, greyish-brown to pale ferruginous-brown. Fore wing: a broad dark brown band along the discocellulars; an upper discal slightly curved similar band stopping short at vein 3; these two bands slightly inclined towards each other; a transverse band posterior, and similar to these two but more irregular in shape, reaches almost down to the dorsum, thus forming the stem of a rough Y-shaped figure, of which the upper two bands are the arms; these markings are superposed on a slightly sullied white area that replaces the brown ground-colour from the middle of the cell outwards up to the terminal markings and from just above the dorsal margin to the subcostal vein and vein 7, above which there are in succession four obliquely placed, short, subcostal white lines; terminal markings consist of a pair of transverse, sublunular, subterminal white lines and a terminal straighter similar line: the space between the two subterminal lines and an ill-defined anticiliary line dark brown, darker than the shade of the ground-colour. Hind wing: crossed by the following transverse bands of a shade darker than the ground-colour and irregular, much broken and dislocated:—a basal and a medial band both edged on the inner and outer sides by white lines; the latter band posteriorly curved sharply upwards and inwards towards the dorsum; a discal irregular band or block that is also inwardly and outwardly edged with white and bulges outwards in the middle; terminal markings much as on the fore wing but the terminal white line more or less obsolete, clearly defined only in interspaces 1 and 2; on the inner side of this line in interspaces 1 *a*, 1 and 2 are black spots inwardly crowned with ochraceous, the spots in 1 *a* and 1 minute, geminate,

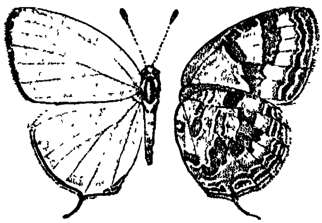
Fig. 88.—*Lampides pura.*

the spot in interspace 2 the largest. Antennæ black, shafts speckled with white; head, thorax and abdomen pale brown, thorax and base of abdomen bluish white; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: ground-colour paler and whiter than in the ♂, the markings of the underside in some specimens more clearly apparent through transparency than in the ♂. Fore wing: a very broad black terminal margin broadest at the apex and apical portion of the costa, of which it occupies about a third, posteriorly it narrows slightly to the tornus. Hind wing: as in the ♂ but with a postdiscal transverse lunular line and a subterminal row of spots dusky brown. *Underside*: much as in the ♂ but the transverse dark brown bands somewhat straighter.

Exp. ♂ ♀ 33–40 mm. (1·33–1·57″).

Hab. Assam; Chittagong hill-tracts; Burma and Tenasserim.

The above descriptions are taken from specimens of the wet-season brood, but there is not much seasonal variation at any rate in those from Tenasserim, from which locality only I have dated specimens. In specimens taken in Tavoy, in April, the ground-colour on the underside is a deeper brown but nothing like so dark as it is represented on the hind wing of the ♀ figured by de Nicéville. Some specimens are very like the type of *L. conferenda*, Butler, which form I consider is a pale variety of this insect and not of *L. celeno*.

756. **Lampides celeno**, *Cramer* (Papilio), *Pap. Exot.* i, 1775, pl. 31, figs. C, D; *Elwes*, *P. Z. S.* 1892, p. 625.
Hesperia ælianus, *Fabr. Ent. Syst.* iii, 1793, p. 280; *Butler* (Lampides), *Cat. Fab. Lep. B. M.* 1869, p. 166; *Moore* (Lampides), *Lep. Ceyl.* i, 1881, p. 94, pl. 38, figs. 3, 3*a*, 3*b*, ♂ ♀, larva & pupa; *de N.* (Lampides) *Butt. Ind.* iii, 1890, p. 167.

Race kinkurka.

Lampides kinkurka, *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 481; *id* (Lycæna) *Novara Reise, Lep.* ii, 1865, p. 273, pl. 34, figs. 24, 25, ♂; *de N. Butt. Ind.* iii, 1890, p. 171.

Dry-season brood.—♂. *Upperside*: pale bluish white. Fore wing: terminal margin narrowly edged with black that broadens very slightly towards the apex of the wing; cilia brownish black. Hind wing: uniform, except for an anticiliary black line edged on the inner side somewhat obscurely by a white line within which and touching it is a row of black spots, the anterior spots very faint, the spot in interspace 2 large and well-defined, two geminate spots in interspace 1 and a very small black lunular dot in interspace 1*a*; cilia brown, white at the base in the interspaces. In specimens obtained in the height of the dry season the black edging to the termen of the fore wing is much reduced and the subterminal series of black spots in the hind wing is altogether obsolete. *Underside*: greyish brown. Fore wing: with seven transverse white fasciæ as follows:—two short fasciæ one each side of the discocellulars, the inner one continued downwards to vein 1 and both represented at the costa by two detached spots; two parallel discal fasciæ, the inner one broken at and the outer one terminating on vein 3; two parallel subterminal fasciæ, the outer one slightly lunular; lastly, a more slender terminal fascia followed by an anticiliary slender black line; the dorsal margin narrowly white; cilia brownish black, their bases white in the interspaces. Hind wing: crossed by nine white fasciæ or lines as follows:—three between base of wing and apex of cell, those posteriorly in interspace 1 or on vein 1 abruptly turn upwards and terminate on the dorsum; the first fascia beyond the cell extends from vein 6 to vein 2, then curves upwards in interspace 1; the next extends straight from just below the costa to vein 4, thus overlapping the previous fascia for a short distance; the next or postdiscal fascia runs between the costa and vein 3, the subterminal two also between the costa and vein 3 but the inner one of the two fasciæ is extended down to interspace 1 and there curves upwards towards the dorsum; both the subterminal fasciæ are more or less lunular; in the interspace below vein 2 is a large subterminal black spot speckled with metallic blue scales and bordered inwardly by ochraceous orange; there are also in interspaces 1*a* and 1 two black dots inwardly edged by a short white striga set in an ochraceous background; lastly, there is a complete terminal white line followed by a black anticiliary line and a filamentous short black white-tipped tail at apex of vein 2; cilia as on the upperside. Antennæ brownish black, the shafts as usual tinged with white; head, thorax and abdomen pale brown, bluish on thorax and base of abdomen; beneath: the palpi, thorax and abdomen white, the third joint of the palpi and the second joint anteriorly black.—♀. *Upperside*: ground-colour paler than in the ♂, often quite white; terminal black edging to fore wing very much broader, broadest at apex, its margin there diffuse. Hind wing: differs from that of the ♂ as follows:—costal margin broadly dusky black; a postdiscal transverse series of dusky-black connected lunules often more or less obsolescent; this is followed by a series of black spots each set in a background of the white ground-colour; an anticiliary slender black line as in the ♂. *Underside*: ground-colour paler than in the ♂, the markings however, precisely similar. Antennæ, head, thorax and abdomen as in the ♂.

Wet-season brood.—♂ ♀. Closely resembles the ♂ ♀ of the dry-season brood: the markings are similar but the ground-colour is generally darker both on the upper and undersides, while the black edging to the fore wing and the black postdiscal and terminal markings to the hind wing on the upperside are broader and more clearly defined. Antennæ, head, thorax and abdomen as in the dry-season brood.

Exp. ♂ ♀ 28–40 mm. (1·10–1·56″).

Hab. Throughout our limits, except in the most desert tracts, and at elevations over 6000 feet.

A very variable form both in the ground-colour and in the markings. The fasciæ on the underside are often so disjointed that it becomes difficult to trace their connections or course.

Larva. "When full-fed just half an inch in length, of a dull reddish-green colour, thickly shagreened with minute white tubercles, scarcely, if at all, hairy; the head pale ochraceous, entirely hidden beneath the second segment; the segments increasing in width to about the fifth, the two anal segments slightly decreasing and above flattened, especially the thirteenth; the erectile organs very small; a dorsal pulsating line, somewhat darker than the rest of the body; a subdorsal series of pale green oblique streaks, one on each segment on each side from the third to the eleventh segment inclusive; no other conspicuous markings. Dr. Forel has identified the ant that attends the larva in Calcutta, as *Camponotus mitis*, Smith (= *bacchus*, Sm. = *ventralis*, Sm.). Dr. G. King identifies the plant on which the larva feeds in Calcutta as *Heynea trijuga*, Roxburgh." (*de Nicéville.*)

Pupa. "Of the usual Lycænid shape, quite smooth, neither hairy nor pitted, pale ochreous greenish, the upper portions of the abdominal segments darker, covered throughout with coarse, rounded, blackish spots placed irregularly; a dorsal and a subdorsal series of similar but larger spots or blotches placed regularly. Head bluntly rounded, thorax slightly humped and constricted posteriorly, end of the abdomen rounded." (*de Nicéville.*)

Race **kinkurka**, Felder.—An insular form that has varied considerably and has developed into a well-marked race (fig. 89 *a*). ♂ ♀ differ from the typical form as follows:—♂. *Upperside*: very much paler, almost silvery white. Fore wing: shaded very slightly with fuscous towards the apex; postdiscal and subterminal diffuse dusky bands within the anticiliary black line; cilia brown, whitish along the tips and at the tornal angle. Hind wing: an anticiliary black line and a subterminal series of black spots as in the typical form, but the latter superposed on well-marked, larger, slightly bluish-white spots that fill the apices of the interspaces; as in *celeno*, these black spots become faint anteriorly; inwardly the series of large bluish-white background spots is bounded by a well-marked, lunular, broad, dusky band; cilia white. *Underside*: ground-colour very much paler than in the typical form, a very pale silvery grey, almost white; markings on both fore and hind wings as in *celeno*, but in most specimens the transverse white fasciæ are slightly broader proportionately and the subterminal two and terminal fasciæ narrowly connected by linear extensions of white along the veins; tail black tipped with white. Antennæ, head, thorax and abdomen as in the typical form but the thorax and abdomen on the upperside paler. The sexes are very much more alike than in the typical form.—♀. Only differs from the ♂ in the ground-colour which is paler, and in the apex of the fore wing on the upperside, which is shaded to a varying extent and degree with diffuse fuscous black.

Exp. ♂ ♀ 28–36 mm. (1·10–1·40″).

Hab. The Nicobars.

757. **Lampides elpis**, *Godart* (Polyommatus), *Encycl. Méth.* ix, 1823, p. 654; *Moore, P. Z. S.* 1878, p. 833; *id. Lep. Ceyl.* i, 1881, p. 95, pl. 38, figs. 4, 4 *a*, ♀; *de N. Butt. Ind.* iii, 1890, p. 161; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 377.

Lampides kankena, *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 481; *id.* (Lycæna) *Novara Reise, Lep.* ii, 1865, p. 270, pl. 34, fig. 37 ♂; *de N. Butt. Ind.* iii, 1890, p. 174.

Lampides pseudelpis, *Butler, Trans. Linn. Soc., Zool.* (2) i, 1879, p. 547, pl. 68, figs. 8, 9, ♂ ♀.

Wet-season brood.—♂. *Upperside*: azure-blue deepening in tint towards the apex of the fore wing. Fore wing: a narrow black terminal edging widened towards the apex; cilia brownish black. Hind wing: costal margin broadly, dorsal margin more narrowly paler than the ground-colour; a subterminal series of black spots edged outwardly with white, the spot in interspace 2 the largest, oval or round, the others smaller, transversely sublinear; a clearly defined anticiliary black line; cilia brown with a white line along their bases, often restricted to the posterior half of the wing. *Underside*: greyish brown. Fore and hind wings: two subterminal and a terminal white transverse line succeeded by an anticiliary black line on each wing, the ground-colour enclosed between these lines of a slightly darker shade with the appearance of somewhat maculate transverse bands. On the hind wing near apices of interspaces 1 *a*, 1 and 2 enclosed between the inner of the two subterminal white lines and the terminal white line are a large round black spot inwardly edged with ochraceous in interspace 2, two minute black geminate spots in interspace 1 and a similar single spot in interspace 1 *a*, the latter three spots superposed on a white ground and above the white a narrow transverse short ochraceous line. Fore wing: in addition four obliquely placed, transverse, white parallel fasciæ as follows:—two, one on either side of the discocellulars extended between the subcostal vein and the dorsum; two upper discal lines broken and sinuate, extended from just below the costa, the inner line to vein 3, the outer line to vein 4. Hind wing: crossed by five transverse parallel white fasciæ besides the terminal markings already mentioned, these are all more or less interrupted and broken anteriorly and the inner four abruptly curved upwards posteriorly. Antennæ, head, thorax and abdomen dark brown, the shafts of the antennæ ringed with white, the thorax and abdomen at base with a little blue pubescence; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: pale blue with a slight purple tinge. Fore wing: costa increasingly to the apex, termen decreasingly to the tornus heavily edged with black; at the apex of the wing the black occupies about one-fourth of the wing. Hind wing: markings as in the ♂ but the subterminal line of black spots much more clearly defined; the spots larger, edged prominently on both inner and outer sides with white, which on the inner side is margined by a lunular heavy transverse black line. *Underside*: precisely as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂.

Dry-season brood.—♂ ♀. Similar to the ♂ ♀ of the wet-season brood but differ as follows:—♂. *Upperside*: pale purplish-blue fading on the discs of the wings in some specimens to white; terminal black edging to the fore wing narrower; markings on the hind wing fainter, trending towards obsolescence. *Underside*: from very pale ochraceous white to dark earthy ochraceous; markings identical with those in specimens of the wet-season brood, but in some of the very pale specimens the white fasciæ assume a pale greenish-blue metallic tint. Antennæ, head, thorax and abdomen as in the wet-season specimens but paler.—♀. Differs from the wet-season specimens only in the paler ground-colour both on the upper and undersides, on the former also by the narrowness of the black edging to the fore wing, and the subobsolescence of the markings on the hind wing.

Exp. ♂ ♀ 32–40 mm. (1·25–1·57″).

Hab. Sikhim; Bhutan; Bengal: Malda, Calcutta, Orissa; Southern India: the Nilgiris, North Canara, Mysore, Travancore; Ceylon; Assam; Burma; Tenasserim; the Andamans; Nicobars; extending through the Malayan Subregion to Java.

Larva. "Feeds on the flowers and seeds of the cultivated cardamom and also on those of *Kœmpfœria pandurata.* It is very similar to that of *L. celeno*, Cramer, but is of a pink hue, with well-defined stripes of red dorsally and laterally." (*Davidson, Bell & Aitken.*)

Pupa. "... found inside the fruit, or in the cluster of dead flowers above the fruit; is smooth and of a dull yellowish brown, marked with interrupted bands of a darker brown. In shape it is similar to (that of) *L. celeno.*" (*Davidson, Bell & Aitken.*)

Var. *kankena* (Pl. XX, fig. 148), Felder, which I am unable to separate from *L. elpis*, seems to me to differ only in the absence of the terminal markings on the upperside of the hind wing in the ♂. *L. kankena* was described originally from Kar Nicobar, but it is found (*fide* Distant, de Nicéville, Elwes and others) in the Malay Peninsula, Perak, Burma and the Philippines. I have seen specimens also from Sikhim and the Andamans which are inseparable from those from the Nicobars. Also I can see no difference in the genitalia of males of true *elpis* and males with the unspotted terminal margin to the hind wing, from the Nicobars.—[N.B. The coloured figure here given is, I regret to say, badly reproduced by the three-colour process. The insect is really much more blue than the dark purple as represented here.]

I have two specimens of a *Lampides* from the Central Nicobar group which on the underside are identical in ground-colour and markings with *L. elpis* var. *kankena*, but on the upperside are quite different. The ground-colour is uniform slaty-plumbeous frosted with a silvery sheen, the tornal markings on the hind wing as in var. *kankena*. Both specimens are males and not in good condition, and I prefer at present simply to point out the above difference between them and *L. elpis*. If new the form may stand as

LAMPIDES ROGERSI *mihi*, named after Mr. C. G. Rogers, Conservator of Forests, of the Imperial Forest Department of India, to whom I owe the gift of a large and very valuable collection of butterflies from the Andamans and Nicobars. For better recognition I figure the form (Pl. XX, fig. 149).

758. **Lampides kondulana,** *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien,* xii, 1862, p. 484; *id.* (Lycæna) *Novara Reise, Lep.* ii, 1865, p. 271, pl. 34, fig. 6 ♂; *de N. Butt. Ind.* iii, 1890, p. 172.

♂. *Upperside*: pale blue with a purplish tint, fore wing posteriorly and hind wing entirely paler; in certain lights both wings have a silvery glint. Fore wing: darkening towards the apex; interspaces terminally with obscure fine fuscous striæ, "resting exteriorly on a slender white line" (almost obsolete in the sole specimen that I have); cilia brown with an anticiliary black line. Hind wing: costa slightly paler than the ground-colour; a subterminal series of black spots decreasing in size and definition anteriorly, outwardly bounded by a white line that is interrupted by the crossing of the veins; the spot in interspace 2 the largest, interspace 1 with two minute geminate spots, interspace 1*a* with a similar minute single spot; a transverse short white line crowned by an obscure fuscous line; on the inner side of the latter three subterminal spots; finally, an anticiliary slender black line as on the fore wing. Cilia fuscous brown with a slender white line along their bases; tail black tipped with white. *Underside*: pale fawn-colour. Fore wing: a short transverse white line on either side of the discocellulars, both continued posteriorly to the dorsal margin but broken at the joining with the short discocellular lines; beyond this a pair of parallel, short, upper discal white lines that form a more or less catenulated band and extend from vein 9 to vein 4, the inner of the two broken at that vein and continued to vein 3; terminal markings consist of two transverse subterminal and a similar terminal white line followed by an anticiliary black line; the space between the subterminal lines and between them and the terminal line darker than the ground-colour of the wing and with a maculated appearance. Hind wing: crossed by the following irregular white lines:—a basal pair, broken at the subcostal and median veins, and posterior to them a dark spot on the dorsum; a medial pair from the subcostal vein to the dorsum, anteriorly passing one on each side of the discocellulars and posteriorly curved sharply upwards; an obliquely placed, very much interrupted and broken upper discal pair from costa to vein 4, the inner one broken at vein 4 and continued posteriorly to vein 5; terminal markings much as in the fore wing; the inner subterminal white

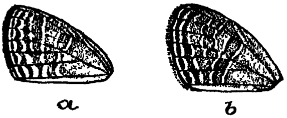

Fig. 89.
a. Lampides celeno, race *kinkurka*.
b. Lampides kondulana.

line shifted inwards and enclosing between it and the terminal white line a black spot in interspace 3, a very large similar spot in interspace 2 and a smaller but very irregularly shaped spot in interspaces 1 *a* and 1, all three spots bordered inwardly and laterally with ochraceous; the terminal white line very broad posteriorly at the tornal angle, with a prominent white spot on each side of the tornal spot in interspace 1; finally, a slender black anticiliary line as on the fore wing. Antennæ black, the shafts ringed with white; head, thorax and abdomen dark brown, the thorax with purplish-blue hairs; beneath: the palpi, thorax and abdomen dusky white.—♀. *Upperside*: pale blue without or with only a very faint purple tint. Fore wing: costa, apex very broadly and termen broadly but decreasingly to the dorsum black; a subterminal nearly obsolete transverse series of bluish-white lunules, very faintly marked towards the apex; cilia as in the ♂. Hind wing: the costal broadly, the dorsal margin more narrowly paler than the ground-colour; terminal markings as in the ♂ but more clearly defined, the black subterminal spots encircled with white, the white edging bounded inwardly by a transverse series of fuscous-black lunules; cilia and short filamentous tail as in the ♂. *Underside*: ground-colour and markings very similar to those in the ♂ but more clearly defined.

Exp. ♂ ♀ 32–38 mm. (1·25–1·49").

Hab. The Nicobars; Kondul.

This form is probably only a race of the widely distributed *L. elpis*, Godart. In the pale ground-colour on the upperside and in the neatness and slenderness of the white line markings on the underside however, it looks tolerably distinct from *kankena*, Felder, which is the variety of *L. elpis* found in the Nicobars.

Genus **CATOCHRYSOPS**.

Catochrysops, *Boisduval, Voy. Astrolabe, Lep.* 1832, p. 87; *Moore, Lep. Ceyl.* i, 1881, p. 90; *de N. Butt. Ind.* iii, 1890, p. 175.

Type, *C. strabo*, Fabr., from Java.

Range. Indo- and Austro-Malayan Regions.

♂ ♀. Fore wing: costa arched; apex moderately acute but not produced; termen convex; tornus obtuse; dorsum straight; cell about half length of wing; upper discocellular in line with subcostal vein, middle and lower vertical; vein 7 from well before upper apex of cell; vein 8 absent; vein 9 from middle of 7; vein 10 from apical third of subcostal vein; vein 11 at base well separated from base of 10; veins 11 and 12 touching; vein 12 bent towards vein 11. Hind wing: elongate, pear-shaped; costa not much arched; apex rounded; termen comparatively slightly convex; tornus well-marked; dorsum slightly convex; cell short, not half length of wing; vein 3 from before lower apex of cell; vein 7 at base closer to apex of cell than to base. Antennæ slender, about half length of fore wing, club gradual; palpi subporrect, third joint about half length of second; eyes in the typical form hairy; body robust.

Of the three forms of *Catochrysops* that occur within our limits two have the eyes smooth; the venation however, is slightly variable and the forms with smooth eyes have veins 11 and 12 of the fore wing very close to each other but not touching.

Key to the forms of Catochrysops.

a. Eyes hairy.................................. *C. strabo*, p. 411.
b. Eyes smooth..............................
  a'. Upperside hind wing: subterminal spots in interspaces 1 and 2 markedly unequal .... *C. pandava*, p. 413.
  b' Upperside hind wing: subterminal spots in interspaces 1 and 2 equal or nearly so .... *C. cnejus*, p. 415.

759. **Catochrysops strabo** (Pl. XIX, fig. 143 ♂), *Fabr.* (Hesperia) *Ent. Syst.* iii, 1793, p. 287; *Boisduval, Voy. Astrolabe, Lep.* 1832, p. 88; *Moore, Lep. Ceyl.* i, 1881, p. 91, pl. 37, figs. 2, 2 *a*, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 177; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 377.

Catochrysops lithargyria, *Moore, A. M. N. H.* (4) xx, 1877, p. 340; *id. Lep. Ceyl.* i, 1881, p. 91; *de N. Butt. Ind.* iii, 1890, p. 178.

♂. *Upperside*: pale violet with in certain lights a blue, slightly silvery sheen. Fore wing: a slender anticiliary dark line. Hind wing: interspace 1 with a short transverse subterminal brown bar edged inwardly with white; interspace 2 with a prominent round black spot edged very faintly on the inner side by a diffuse bluish lunule; the dark subterminal spots of the underside apparent through transparency; an anticiliary slender jet-black line more conspicuous than in the fore wing, in some specimens edged inwardly in the posterior interspaces with white; this line is present in interspaces 1 and 2 in all specimens. Cilia of both fore and hind wings white transversely traversed medially by a brown line; tail black tipped with white. *Underside*: pale dull grey. Fore wing: a short transverse band on the discocellulars, a small round subcostal spot in interspace 10, a transverse discal band that extends from veins 1 to 7, the portion below vein 3 dislocated and shifted inwards, a transverse subterminal ill-defined band and a terminal series of inwardly rounded spots, each of which subapically fills an interspace, dark greyish-brown; the discocellular and discal bands edged inwardly and outwardly by white lines, the subcostal spot encircled with white and the subterminal band and terminal spots edged on their inner sides with the same colour; lastly, a dark greyish-brown anticiliary line. Hind wing: a subbasal spot and a spot beyond it in interspace 7, a large round subterminal spot crowned with ochraceous in interspace 2, two geminate specks subterminally in interspace 1 and a terminal similar speck in interspace 1 *a*, black, the spots in interspace 7 encircled with white; a lunular spot in middle of cell, two elongate spots in transverse order below it, a short transverse band on the discocellulars and a very irregular, transverse, sinuous discal band dark greyish-brown, edged inwardly and outwardly with white; beyond these is an inner subterminal series of greyish-brown lunules followed by an outer subterminal series of similarly coloured spots, the latter encircled with white, and a black anticiliary slender line. Antennæ, head, thorax and abdomen dark brown, a little purplish on the thorax, the shafts of the antennæ speckled with white; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*, fore wing: costa, apex and termen broadly brownish-black, rest of the wing whitish, flushed and overlaid especially at base with metallic blue. Hind wing: costa and termen broadly fuscous or brownish black, the rest ot the wing whitish flushed with metallic blue as on the fore wing which, however, does not spread to the dorsal margin; a discal curved medial series of fuscous spots; a transverse, incomplete, postdiscal series of white sagittate lunules followed by a subterminal series of spots as follows, superposed on the brownish-black terminal border:—two black geminate dots margined inwardly and outwardly with white, a large black spot crowned broadly with ochraceous inwardly and edged slenderly with white on the outer side in interspace 2, and anterior to that a transversely linear black spot encircled with white in each interspace. Cilia of fore wing brown, of hind wing white traversed by a transverse medial brown line. *Underside*: ground-colour and markings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂. Eyes in both sexes hairy.

Exp. ♂ ♀ 27–38 mm. (1·08–1·49″).

Hab. Peninsular India south of the outer ranges of the Himalayas; Ceylon; Assam; Burma; Tenasserim; the Andamans; Nicobars; extending through the Malayan Subregion down to Australia.

An extraordinarily variable form both in the shade of the ground-colour on the upperside and in size. One variety (*lithargyrea*, Moore), which has the ground-colour on the upperside more blue than purple in the ♂, is not uncommon throughout the range of the insect, nor has there any corresponding difference been found among the females, while in the blue males the markings are precisely the same as those of typical males.

Larva. "Of the usual shape (*i. e.* onisciform); head light yellow margined with brown; body light rose, covered with tiny star-topped stems so arranged as to make diagonal whitish lines to each segment; a subdorsal line on the back; anal segment nearly square, the margin (? margins) of the body clothed with light coloured and longish hair." (*Davidson, Bell & Aitken.*)

Pupa. "Of the usual form, covered with stiff erect hair; colour light rose with a black patch on the second segment and centre of thorax; it has also a dark dorsal line and the lower segments are smudged with black." (*Davidson, Bell & Aitken.*)

760. **Catochrysops pandava,** *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1829, p. 84; *Moore, Lep. Ceyl.* i, 1881, p. 92, pl. 37, figs. 1, 1 *a*, 1 *b*, ♂ ♀, larva & pupa; *de N. Butt. Ind.* iii, 1890, p. 183, pl. 27, fig. 187, ♀ wet-season form.

Catochrysops nicola, *Swinhoe, P. Z. S.* 1885, p. 132; *de N. Butt. Ind.* iii, 1890, p. 185.

Wet-season brood.—♂. *Upperside*: lavender-blue. Fore wing: costa narrowly, terminal margin more broadly fuscous brown, the latter with in addition an anticiliary black line; cilia light brown transversely traversed close to but not at their bases by a dark brown line. Hind wing: costa narrowly fuscous brown; a subterminal series of black spots outwardly edged by a white line; the spot in interspace 2 the largest and inwardly crowned more or less broadly with ochraceous yellow; an anticiliary black line and the cilia as on the fore wing. *Underside*: greyish brown. Fore and hind wings: the following transverse darker brown markings on each wing, the markings edged on the inner and outer sides with white lines—a short bar across the discocellulars, a discal catenulated band, the posterior two elongate spots of which on the fore wing are *en échelon*, while the band on the hind wing is bisinuate and is capped anteriorly near the costa by a round black spot encircled with white; the above are followed by maculated inner and outer subterminal bands, which on the hind wing are curved and more or less interrupted on the tornal area by a comparatively large round black spot in interspace 2 and a smaller similar spot in interspace 1, both spots inwardly crowned with ochraceous; the white edgings on the inner side to both subterminal bands on the hind wing are more or less lunular. In addition on the same wing there is a subbasal curved row of four white-encircled spots, of which the anterior two and the spot on the dorsum are black, the other dark brown. Antennæ black, shafts ringed with white; head, thorax and abdomen brown, the head and thorax clothed with bluish hairs; beneath: palpi, thorax and abdomen whitish.—♀. *Upperside*: brown. Fore wing: shot with blue from base outwards for a little over half its length down its middle, this blue irroration not extended to the costal margin; a slender anticiliary black line. Hind wing: a touch of blue iridescence near base; terminal markings much as on the fore wing but the subterminal spots larger and not extended beyond interspace 6; in addition postdiscally there is a lightening of the shade of the ground-colour, between which paler area and the subterminal spots the ground-colour assumes the form of a postdiscal, short, transverse lunular band. *Underside* as in the ♂, the markings slightly larger and more clearly defined. Antennæ, head, thorax and abdomen as in the ♂ but slightly paler.

Dry-season brood.—♂ ♀. Very similar to the same sexes of the wet-season brood, but can be recognized by the following differences:—*Upperside*: ♂. Ground-colour slightly duller; subterminal spots on the hind wing less clearly defined. ♀. The blue shot area extended outwards on the fore wing for three-fourths of its length from base, but as in wet-season specimens not reaching the costal margin; on the hind wing the blue suffusion covers the entire medial portion of the wing from the base to the subterminal row of spots, of which latter the spot in interspace 2 is entirely without the inner ochraceous edging.—♂ ♀. *Underside*: ground-colour darker than in specimens of the wet-season brood, the discocellular and discal transverse bands on both fore and hind wings broader, the terminal markings very ill-defined, the inner white edging to the inner of the two subterminal transverse bands broadened and very diffuse. On the hind wing the discocellular and discal bands coalesce and form an ill-defined diffuse medial cloud on the wing.

Exp. ♂ ♀ 24–32 mm. (0·93–1·24″).

Hab. Peninsular India south of the outer ranges of the Himalayas, but not in the desert tracts and somewhat local; Ceylon; Assam; Burma; extending into the Malayan Subregion.

Larva. "When full-grown a little over half an inch in length, of two distinct colours, some being bright green, others of a dark reddish purple (vinous) . . . . head very small, black, shining and hidden beneath the second segment, the third segment larger than the second, the other segments about equal in size, the anal segment flattened and rounded, divisions between the segments well-marked. The larva throughout is very rough, widely pitted or depressed and covered with very minute white tubercles bearing very short fine hairs, neither the hairs nor the tubercles being visible without a lens. The body at its highest and widest part is wider than high. It is extremely variable in its markings, hardly any two being exactly alike; there is usually a dark, dorsal, subdorsal and lateral line dividing the upper surface of the body into three equal areas, the dorsal and two subdorsal lines coalescing on the eleventh segment and forming a broad band to the thirteenth. In some specimens the divisions between the segments are marked with darker and there is a subdorsal series of oblique dark lines, one on each segment between the dorsal and subdorsal lines. The underside of the body and legs seems to be always green. The erectile organs on the twelfth segment very small. Feeds in Calcutta on *Cycas revoluta*. In Calcutta three species of ants attend this larva, which Professor Forel has identified for me as *Prenolepis longicornis*, Latr., *Monomorium speculare*, Mayr and *Cremastogaster*, n. sp." (*de Nicéville.*)

Pupa. "Of the usual Lycænid form, quite smooth, more or less fuscous, with a darker dorsal and subdorsal line, head-case somewhat square, thorax slightly humped and constricted posteriorly, spiracles pale. Though the larvæ swarm in April and May in Calcutta on the cultivated cycads in gardens, eating the hardly opened shoots or fronds, thereby utterly destroying the appearance of the plant for the year, I have never succeeded in finding the pupa on the plants, and can only conclude that the ants drive the full-grown larvæ down the stems of the plants into their nests, where the larvæ undergo their transformations." (*de Nicéville.*)

C. nicola, Swinhoe, the type of which, a ♀, is now in the British Museum has (and I consider quite rightly) been placed in the Museum arrangement by Dr. Butler as a form intermediate between the wet-season and dry-season forms of *C. pandava.* In describing it Col. Swinhoe says that on the upperside the "*Hind wing* with five marginal largish black spots surrounded by yellowish." The type-specimen certainly does not agree with this. In point of fact all the markings are only paler and a little more diffuse than in an ordinary wet-season specimen.

761. **Catochrysops cnejus**, *Fabr.* (Hesperia) *Ent. Syst. Suppl.* 1798, p. 430; *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1829, p. 83; *Moore, Lep. Ceyl.* i, 1881, p. 92; *de N. Butt. Ind.* iii, 1890, p. 178.

Lampides contracta, *Butler, P. Z. S.* 1880, p. 406, pl 39, fig. 3; *de N.* (Catochrysops) *Butt. Ind.* iii, 1890, p. 181.

Catochrysops ella, *Butler, P. Z. S.* 1881, p. 606; *de N. Butt. Ind.* iii, 1890, p. 180.

Catochrysops hapalina, *Butler, P. Z. S.* 1883, p. 148, pl. 24, figs. 2, 3, ♂ ♀; *de N. Butt. Ind.* iii. 1890, p. 182.

Catochrysops theseus, *Swinhoe, P. Z. S.* 1885, p. 131, pl. 9, fig. 8 ♂; *de N. Butt. Ind.* iii, 1890, p. 180.

♂. *Upperside*: pale purplish suffused with a bluish shade, apparent only in certain lights. Fore wing: a slender black anticiliary line edged on the inner side narrowly with fuscous dark brown, broader at apex than at the tornal angle. Hind wing: a subterminal black spot in interspace 1 and another similar spot in interspace 2, the two spots subequal in size, edged on the outer side by a white thread and on the inner side with ochraceous, more prominent in the spot in interspace 2; a slender anticiliary black line with an inner narrow margin of diffuse fuscous brown. Cilia of both fore and hind wings pale; tail at apex of vein 2 of the hind wing black tipped with white. *Underside*: silver-grey, in some with a pale yellowish, in others with a faint brown tint. Fore and hind wings: each with the following brown spots edged slenderly on either side with white:—a transverse elongate spot on the discocellulars; a transverse discal series of spots straight on the fore, bisinuate on the hind wing, on the latter wing capped near the costa by a prominent white-encircled round black spot; an inner and an outer subterminal transverse series of spots, of which the inner subterminal series on the hind wing is lunular, the outer rounded, the white edging to both series being also lunular; both wings have very slender anticiliary black lines, and the hind wing in addition a transverse curved subbasal series of generally three often four white-encircled spots of which the spot nearest the costa is prominent and black, the others brown. Antennæ, head, thorax and abdomen dark brown, paler on the last, the shafts of the antennæ speckled with white, the thorax with a little purplish pubescence; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: dark brown. Fore wing: a postero-medial somewhat triangular area from the base outwards for about two-thirds the length of the wing blue and a slender jet-black anticiliary line. Hind wing: posteriorly from about the level of the middle of the cell slightly suffused with blue from base outwards for about two-thirds the length of the wing; a transverse, postdiscal, incomplete series of sagittate white spots pointing inwards, followed by a subterminal transverse series of round spots, the anterior three dark brown encircled with bluish white, the tornal two jet-black, subequal, larger than the others, edged inwardly with bright ochraceous, outwardly by very slender white lines; finally, a jet-black slender anticiliary line. Cilia of both fore and hind wings conspicuously white. *Underside*: ground-colour and markings as in the ♂, the tornal two black spots touched outwardly with metallic bluish-green scaling. Antennæ, head, thorax and abdomen similar to those of the ♂, the shafts of the antennæ conspicuously ringed with white.

Exp. ♂ ♀ 26–33 mm. (1·03–1·33″).

Hab. Throughout our limits except at very high elevations. Widely distributed in the Malayan Subregion; extending to Australia and the South Sea Islands.

Larva. "Of the usual Lycænid shape .... the head small, black, shining, retractile. Colour of body pale green with darker green or reddish dorsal and subdorsal lines, the latter coalesced into a broad band between the eleventh and last segments. The entire surface of the body covered with minute white tubercles, there are also a few scattered white hairs. The segmental constrictions shallow. Spiracles black. Extensile organs on the twelfth segment small. The larva is broader than high in its higher part, increasing in width to fourth segment, from thence to the flattened anal segment of about uniform width. Bred by me in Calcutta on *Phaseolus trilobus*, Linn. Mr. W. C. Taylor reports that the larva feeds in Orissa on *Dolichos catjang*, Roxb. Dr. A. Forel identifies the ant in Calcutta as *Camponotus rubripes* (= *sylvaticus*, Fabr.), subspecies *compressus*, Fabr." (*de Nicéville.*)

Pupa. "Very pale green, the abdominal segments somewhat opaque; of the usual Lycænid shape, no distinctive structure or markings. Head-case square, thorax slightly humped, slightly constricted before the first abdominal segment, a dark dorsal line extending the whole length; spiracles black; entire surface smooth not hairy." (*de Nicéville.*)

After examination of the types and of the series of specimens in the British Museum of the following, I agree with de Nicéville that they are all either climatic or local unstable varieties of *C. cnejus*. One of these, *C. theseus*, Swinhoe, is clearly an aberration. Vars. *ella* and *contracta*, Butler, are dwarfed forms with pale markings and ground-colour on the underside. Var. *hapalina*, Butler, differs chiefly from the typical form in the transverse macular discal band on the underside of the fore wing, the spots composing which are placed obliquely to one another, not end to end as in typical *cnejus*. *C. theseus*, Swinhoe, is, as mentioned above, an aberration, the bands on the underside are not macular but continuous and somewhat strongly marked.

Genus TARUCUS.

Tarucus, *Moore, Lep. Ceyl.* i, 1881, p. 81; *de N. Butt. Ind.* iii, 1890, p. 186.

Type, *T. theophrastus*, Fabr.

Range. Southern Europe, North and West Africa, Arabia, India, Ceylon, Assam, Burma, China.

♂ ♀. Fore wing: costa slightly arched; apex bluntly angulate; termen convex; tornus well-marked, angulate, slightly obtuse; dorsum straight, about three-fourths length of costa; cell about half length of wing; veins 6 and 7 well separated at base, vein 8 absent, vein 9 from beyond middle of 7, vein 10 at base, closer to vein 11 than to base of vein 7; veins 11 and 12 bent very closely towards each other, typically anastomosed at one point; vein 12 terminates on costa well before lower apex of cell. Hind wing: ample, broad; costa arched; apex and termen curved, convex, apex not well marked; tornus obtuse; dorsum straight posteriorly, convex near base; cell short, not nearly half length of wing; veins 3 and 4 very closely approximate at base, from lower apex of cell, vein 7 from apical half of subcostal, vein 8 strongly curved at base. Antennæ about half length of wing, club fusiform; palpi porrect or subporrect, second joint in front clothed densely with comparatively large scales, not fringed with hairs, third joint naked, aciculate; eyes typically smooth, in one form hairy; body slender.

This genus, which so far as venation goes cannot be separated from *Castalius*, contains within our limits only three forms, one of which is doubtfully distinct. The other two are structurally different, and have by some authors been separated generically.

Key to the forms of Tarucus.

a. Eyes smooth.	
a'. Upperside fore and hind wings: except for an anticiliary dark line concolorous throughout	*T. theophrastus*, p. 417.
b'. Upperside fore and hind wings: broad dark terminal margins, not concolorous throughout	*T. venosus*, p. 419.
b. Eyes hairy	*T. plinius*, p. 420.

762. **Tarucus theophrastus** (Pl. XX, fig. 151 ♂), *Fabr.* (Hesperia) *Ent. Syst.* iii, 1793, p. 281; *Moore* (Lycæna), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 25; *id. Lep. Ceyl.* i, 1881, p. 81, pl. 36, fig. 3; *de N. Butt. Ind.* iii, 1890, p. 187.

Lycæna nara, *Kollar, in Hügel's Kaschmir*, iv, 1848, p. 241; *Butler* (Tarucus), *P. Z. S.* 1881, p. 606: *de N.* (Tarucus) *Butt. Ind.* iii, 1890, p. 190.

Tarucus alteratus, *Moore, P. Z. S.* 1882, p. 245, pl. 12, figs. 4, 4*a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 192.

Tarucus callinara, *Butler, A. M. N. H.* (5) xviii, 1886, p. 185; *de N. Butt. Ind.* iii, 1890, p. 191.

Tarucus extricatus, *Butler, P. Z. S.* 1886, p. 366, pl. 35, fig. 2 ♂; *de N. Butt. Ind.* iii, 1890, p. 192.

♂. *Upperside*: pale purple to violet with in certain lights a blue suffusion, the markings of the underside apparent through transparency. Fore wing: costal margin above vein 12 suffused strongly with blue; discocellulars with a transverse elongate blackish spot; a slender anticiliary black line. Hind wing: immaculate except for an anticiliary black line as on the fore wing. Cilia of both fore and hind wings dull sullied white with a brownish-black band along their bases. *Underside*: white with the following black markings:—Fore wing: an anticiliary line continued along the costa but not up to the base; a streak from base passing obliquely to the costa; an obliquely-placed irregular mark across the cell with a spot below it in interspace 1; a curved interrupted band beyond, that consists of a spot in interspace 9 joined to a transverse bar across the discocellulars and detached from it a spot in interspace 2 that coalesces with another in interspace 1; following this are four upper discal spots two and two placed obliquely, the lower two often coalescent, a transverse postdiscal more or less macular curved band, and a subterminal transverse series of six round equal-sized spots. Hind wing: an obliquely placed basal streak, a row of three spots across the cell, the upper two spots much elongated, a short bar on the discocellulars and an elongate, transverse, subcostal spot above it; four discal spots, the upper four placed obliquely two and two, the lower two transverse, coalescent; postdiscal band, subterminal transverse series of spots and anticiliary line as on the fore wing; the postdiscal band lunular, all or some of the spots of the subterminal series with shining bluish metallic scales. Cilia as on the upperside; tail black tipped with white. Antennæ, head, thorax and abdomen black, the shafts of the antennæ ringed with white, the thorax with a little bluish pubescence; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: dark brown; bases of the wings suffused with bluish scales. Fore wing: the transverse discocellular spot as in the ♂ but continued posteriorly by a black spot in interspace 2 coalescent with a similar spot in interspace 1 (in some specimens the latter two spots are only seen by transparency from the underside); a medial area beyond apex of cell white, crossed by an upper discal, macular, short black band that extends from vein 3 to vein 6; the ground-colour over the rest uniform; on the costal margin there are some pale lines between veins 10, 11 and 12, and on the broad terminal margin of ground-colour an obscure transverse macular white line. Hind wing: basal, cellular and discal markings of the underside more or less apparent through transparency; a postdiscal and a subterminal transverse series of white somewhat quadrate spots, the two series converge and meet anteriorly in interspace 6, the outer of the two is margined by the series of black subterminal spots of the underside which show through more or less plainly. Cilia of both fore and hind wings and tail at apex of vein 2 of the hind wing as in the ♂. *Underside*: similar to that of the ♂, the ground-colour slightly yellowish, the markings more clearly defined. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 22–31 mm. (0·85–1·22″).

Hab. Northern and Western Africa; Arabia; Persia; Baluchistan; N.W. Himalayas; the Punjab; Western, Central and Southern India; Ceylon; Assam; Upper Burma.

Larva. "Just half an inch in length when full grown, much flattened, the head pale ochreous and completely hidden under the second segment which is somewhat wide, the third and fourth segments progressively a little wider, whence the body gradually tapers to the last segment which is about as wide as the second. Colour pale green, the whole upper surface covered with a shagreening of small white tubercules which under a magnifying-glass give it a frosted appearance; along the lateral edge of the body and round the anal segment there are numerous somewhat long whitish hairs. From the third to the anal segment there is a somewhat broad (slightly decreasing in width posteriorly) yellowish-green dorsal stripe, which bears a red stripe in its middle, decreasingly on the first four segments on which it appears; in some specimens the dorsal stripe is marked with reddish on both sides, which colour is very conspicuous on the twelfth and thirteenth segments. There is also a subdorsal series of small spots from the third to the eleventh segments inclusive which are quite inconspicuous in some specimens. The extensile organs on the twelfth segment are small. The constrictions between the segments slight and inconspicuous .... In India it eats the young leaves and flower-buds of *Zizyphus jujuba.* Dr. A. Forel of Geneva identifies the ants which attend these larvæ as *Camponotus rubripes*, Drury (*sylvaticus*, Fabr. subspecies *compressus*, Fabr.) and *Phidole latinoda*, Roger." (*de Nicéville.*)

Pupa. "Of the usual Lycænid shape; head, thorax and wing-cases green speckled thickly with black, abdomen green. There is an indistinct blackish line extending down the whole length of the body, with a double subdorsal series of indistinct black specks; the head is rounded, the thorax slightly humped; the pupa throughout quite smooth." (*de Nicéville.*)

Tarucus nara, Kollar, insufficiently described from damaged specimens, *T. callinara* and *T. extricatus*, Butler, cannot, in my opinion, be separated from some of the many varieties of the typical form. *T. theophrastus*, var. *callinara* has the markings on the underside large, many of the spots coalescent, as has also var. *extricatus*, the markings on the underside of the wings of which are in addition often rusty-red. In this var. *extricatus* resembles var. *alteratus*, Moore, the most distinct of all the varieties described. These variations however, mainly in colour, are in my opinion climatic or local, and I believe could all be bred under suitable conditions from any typical pair of *T. theophrastus.*

763. **Tarucus venosus**, *Moore, P. Z. S.* 1882, p. 245, pl. 12, figs. 6, 6*a*, ♂; *Doherty, J. A. S. B.* 1886, p. 132; *de N. Butt. Ind.* iii, 1890, p. 193, pl. 27, fig. 189 ♂.

♂ ♀. Very closely resembles *T. theophrastus*, from which it may be distinguished as follows:—♂. *Upperside*: ground-colour darker purple with a darker blue suffusion in certain lights. Fore wing: terminal margin very broadly shaded with brown so that the wing has, when looked at vertically from above, the appearance of a broad brown terminal band. Hind wing: the discocellulars marked by a transverse short black bar. Otherwise as in typical *theophrastus.*—♀. Only differs from ♀ *theophrastus* on the upperside, where the colour of both fore and hind wings is uniform brown; the discal white markings on both wings obsolescent.

Exp. ♂ ♀ 25–32 mm. (1·00–1·28").

Hab. The N.W. Himalyas to Kumaon; Punjab: Campbellpore, Thundiani, Murree: Bengal: Malda.

I agree with the late Mr. de Nicéville that breeding experiments will probably prove that this form belongs merely to the dark wet-season brood of ordinary *theophrastus.*

764. **Tarucus plinius**, *Fabr.* (Hesperia), *Ent. Syst.* iii, 1793, p. 284; *Moore, Lep. Ceyl.* i, 1881, p. 82, pl. 36, fig. 4; *de N. Butt. Ind.* ii, 1890, p. 194.

This form closely resembles in both sexes on the upperside *T. theophrastus*, but the character and disposition of the markings on the underside are completely different.

♂. *Upperside*: dark violet with, in certain lights, a rich blue suffusion. Fore wing: no discocellular black spot so conspicuous in *T. theophrastus*; terminal margin with a narrow edging of fuscous black, widest at the apex, gradually decreasing to the tornus, followed by an inconspicuous anticiliary jet-black line. Hind wing: costal margin slightly but broadly shaded with fuscous, which is continued as a slender anticiliary black line to the tornus. *Underside*: white. Fore wing: with the following brownish-black markings:—an irregular edging along the costa to near the apex from which extends downwards a subbasal band, broadened across the cell and below it; an irregular band that extends along the discocellulars and below them to interspace 1 where it ends in a point; an upper discal curved band of more even width but dislocated below vein 4, the lower portion of it shifted inwards forms a large quadrate spot in interspace 3, below vein 3 the band is continued downwards by two small inconspicuous spots, beyond this is a very short acutely-pointed comma-shaped mark; a very regular evenly curved complete transverse lunular line, a transverse series of subterminal spots and an anticiliary slender line. Close to the base of the wing extended obliquely upwards and outwards from the dorsum is a triangular mark, the edging of white colour left near the base forms above the apex of this mark an acute angle; between the band that crosses the middle of the cell and the transverse discocellular band is a more or less slender, irregular, similarly-coloured line; and between the discocellular and upper discal bands another much shorter line that extends from the costa downwards but does not reach vein 4, this is slightly clavate anteriorly and posteriorly. Hind wing:

mottled with brownish black that leaves only basal, subbasal, medial and discal transverse lines or bands of the ground-colour; the medial and discal bands, which are highly irregular, enclose here and there small brownish markings, the bands themselves coalescing above a very irregularly shaped brown mark that is placed on the posterior half of the middle of the wing; terminal markings as on the fore wing but the subterminal spots larger, the apical one especially so, the tornal two spots jet-black and each encircled by a glittering slender ring of metallic green scales. Cilia of both fore and hind wings, the antennæ, head, thorax and abdomen much as in *T. theophrastus.*—♀. *Upperside*: very closely resembles that of ♀ *T. theophrastus*, but the extent of white on the fore wing is greater so that there is a greater area of white to be seen between the brown markings superposed on it, these markings have the appearance of an irregularly formed **V** on a white background. Hind wing much as in *T. theophrastus. Underside*: similar to that of its own ♂, but the brown bands less broken, more regular. Cilia, antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 22–31 mm. (0·85–1·22").

Hab. Ethiopian Region in part. N.W. Himalayas to Kumaon; the plains of Northern India; Central and Western India; Ceylon; Assam; Burma; Tenasserim in the low hot valleys of the north; extending to China and in the Malayan Subregion to Java.

The description given above is taken from males and females of wet-season broods. Specimens of the dry-season broods are paler on the upperside with, in the ♂, only anticiliary black lines to the wings. On the underside the markings on the wings will, on careful examination, be found very similar but paler brown and all very much reduced in width so that a greater extent of the white ground-colour is visible.

Larva. "Pale greenish yellow above, sides lilacine, a narrow brownish median line, followed by eight diagonal short streaks and six brownish-red spots. Before pupating the colouring gets much more diffused. Feeds among the flower-buds of *Plumbago.*"

Pupa. "Dull yellowish profusely mottled with brown spots." (*E. E. Green as quoted by de Nicéville.*)

Genus CASTALIUS.

Castalius, *Hübner, Verz. bek. Schmett.* 1816, p. 70; *Moore, Lep. Ceyl.* i, 1881, p. 82; *de N. Butt. Ind.* iii, 1890, p. 195.

Type, *C. rosimon*, Fabr., from India.

Range. Ethiopian and Indo-Malayan Regions.

♂ ♀. Fore wing: costa widely arched; apex blunt; termen convex; tornus angulated, well marked; dorsum straight, about three-fourths the length of the costa; cell long, longer than half length of wing; vein 7 from well before upper apex of cell, vein 8 absent, vein 9 out of middle of 7, vein 10 at base closer to base of vein 11 than to base of vein 7; vein 11 anastomosed with vein 12, sometimes for some distance, sometimes only at one point; vein 12 terminates on costa well before apex of cell. Hind wing: costa arched; apex broadly rounded; termen convex: tornus angulated, distinct; dorsum slightly convex, nearly straight; cell not quite half length of wing; veins 3 and 4 from lower apex of cell; vein 7 from a little before upper apex of cell; vein 8 arched, terminated at apex of wing. Antennæ not quite half length of fore wing; club long, gradual, slightly blunt at apex; eyes smooth; palpi porrect or subporrect, densely clothed anteriorly with scales but not fringed, third joint long, aciculate, bare; body comparatively slender.

In venation and structure this genus cannot be separated from *Tarucus* and in fact is linked to it even by coloration through *Castalius ananda*, de Nicéville, a slightly aberrant form.

Key to the forms of Castalius.*

A. Upperside: ground-colour ♂ deep purple; ♀ fuscous .... *C. ananda*, p. 423.

B. Upperside: ground-colour both sexes white; fore wing with narrow costal and broader terminal edgings on inner side of which towards apex some quadrate black spots; bases of wings shot with iridescent light blue .... *C. rosimon*, p. 424.

C. Upperside: ground-colour black. Fore wing: a very broad obliquely transverse white band that extends from the middle of dorsal margin almost to vein 6, with a short outward extension above vein 3.

  a. Underside fore wing: an outwardly oblique very short clavate streak from base not extended to the costal margin .... *C. decidia*, p. 429.

  b. Underside fore wing: an outwardly oblique broad black streak from base to costal margin.

    a'. This streak straight, not curved, reaches costal margin about the middle .... *C. roxus*, p. 428.

    b'. This streak not straight, bent at a right angle before it reaches costal margin just before the middle .... *C. elna*, p. 430.

  c. Underside fore wing: with two outwardly oblique broad parallel bands from base to costal margin.

    a'. Upperside fore wing: medial obliquely transverse white band very broad, edged inwardly on both sides with dark blue; wing from base outwards with iridescent light blue suffusion .. *C. ethion*, p. 426.

    b'. Upperside fore wing: medial obliquely transverse white band narrower, not edged with blue; wing from base outwards with a beautiful iridescent light blue suffusion .... *C. ethion*, race *airavati*, p. 427.

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* Does not include *C. manluena*, Felder, which is unknown to me.

765. **Castalius ananda** (Pl. XX, fig. 150 ♀), *de N., J. A. S. B.* 1883, p. 75, pl. 14, figs. 11, 11 *a*, ♂ ♀ ; *id. Butt. Ind.* iii, 1890, p. 198; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 379, pl. 4, figs. 3, 3 *a*, larva and pupa.

♂. *Upperside*: dark purple, sometimes fuliginous, sometimes bright and shining. Fore and hind wings: terminal margins edged with fuscous brownish-black and an anticiliary jet-black line; cilia brown; tail black tipped with white. *Underside*: more or less dingy white. Fore wing: a broad oblique brownish-black band from base to just before the middle of the costa; from the latter a dark brownish-black bar proceeds vertically down to middle of interspace 3, on the inner side of this and touching it in the middle is a large brownish-black irregular spot that extends posteriorly to vein 1; beyond this a broad discal transverse brownish-black band twice interrupted, the posterior portion slightly narrowed below is shifted obliquely inwards and ends on vein 1; this is followed by a postdiscal transverse series of brownish-black spots that anteriorly nearly coalesces with the discal band, a transverse subterminal line of similar but smaller spots and a well-marked anticiliary black line. Hind wing: a basal short, brownish-black, anteriorly attenuate bar placed obliquely, a transverse subbasal band of four large coalescent black spots, a transverse curved discal band twice broken as on the fore wing and similar postdiscal subterminal and terminal markings. Antennæ black, shafts ringed with white, head, thorax and abdomen dark brownish-black; beneath: the palpi black, thorax and abdomen down the middle white.—♀. *Upperside*: fuscous black. Fore and hind wings: in most specimens the markings of the underside show (sometimes very conspicuously) through. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 22–30 mm. (0·85–1·18″).

Hab. Sikhim; Orissa; Southern India: Kanara, Nilgiri and Anaimalai Hills; Assam: Khási Hills.

Larva. "Like that of *C. rosimon* feeds only on the parenchyma of the leaf .... It is of the usual woodlouse form, slightly flattened head concealed in the second segment; surface more or less rough; a fringe of long white bristles all round with an erected ridge of similar bristles along the back from the second segment; those on the 3rd and 7th segments and the last two much longer than the others; those on the 2nd segment very few, short and black. It has a conspicuous gland on the 12th segment, and is attended by small species of ants of the genus *Cremastogaster*. Its colour is pale green, the dorsal portion of the 2nd, 4th, 5th, 6th and last two segments being dark brown, while the centre segments are almost yellow with a darker dorsal line. We found it feeding on *Zizyphus xylopyrus* and also on *Loranthus*, where it was attended by *Cremastogaster* ants."

Pupa. "Of the usual *Castalius* form but narrow and slightly flattened. It is intensely glossy as if covered with gum. It varies in colour, being sometimes black, at others green with inconstant black markings." (*Davidson, Bell & Aitken.*)

766. **Castalius rosimon**, *Fabr.* (Papilio) *Syst. Ent.* 1775, p. 523; *Hübner, Verz. bek. Schmett.* 1816, p. 70; *Moore, Lep. Ceyl.* i, 1881, p. 83, pl. 36, fig. 2; *de N. Butt. Ind.* iii. 1890, p. 197; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 379.

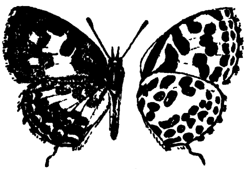

Fig. 90. *Castalius rosimon.* Wet-season brood.

♂. *Upperside*: white. Fore wing: costa, apex and termen edged with black, the edging much broader on apex and termen; base outwards for a short distance more or less densely overlaid with metallic blue scales which cover and make indistinct a large basal outwardly clavate black spot; a transverse black oval spot on the discocellulars touching the black edging on the costa: an oblique irregular line of four quadrate black spots beyond, the upper spot coalescent with the black on the costal border, the next spot below shifted outwards out of line, touching, as does also the lowest spot, the terminal black edging; posterior to this is a quadrate black spot in the apical half of interspace 2, and placed obliquely outwards from it coalescent with the terminal black border, another similar spot in interspace 1. Hind wing: three basal black somewhat coalescent spots overlaid with metallic blue scaling; the costal margin above the subcostal vein and vein 7 black; this colour filling also the base of interspace 6, where in some specimens it is divided into a basal portion with a spot beyond; a postdiscal curved transverse black band followed by a subterminal transverse series of black spots, each spot edged inwardly and outwardly by very slender lunules of the white ground-colour; on the inner side of the postdiscal band posteriorly is a broken line of four black generally coalescent spots two and two, the two upper often touching the postdiscal band. *Underside*: white. Fore wing: a long oblique black band from base outwards to the costa; below it and obliquely placed an irregular black somewhat conical mark; following these are two outwardly oblique, medially interrupted, black macular bands; the inner of the two extended from costa along the discocellulars, is then widely interrupted below its posterior portion that is formed of two elongate coalescent spots and touches the inner subterminal transverse line of elongate spots just above the tornus; the outer, obliquely placed line is subapical and medially broken, the middle portion consisting of a quadrate spot is shifted outwards; finally, two parallel subterminal transverse series of black elongate spots, the inner series of broad, more or less rectangular spots, the outer series of more linear spots, the latter coalescent anteriorly with a slender anticiliary black line. Hind wing: a transverse basal black band, with an elongate black spot below it on the dorsum; a transverse subbasal line of four well-separated black spots; a transverse, oval, discocellular black spot and obliquely above it three subcostal similar spots, the inner two coalescent; postdiscal and terminal markings consist, the former of four black posterior spots two and two, each pair coalescent and placed *en échelon*, the latter of a transverse double series of subterminal black spots and an anticiliary black line; the upper portion of the postdiscal markings touches the inner subterminal line. Cilia of both fore and hind wings white alternated with black at the apices of the veins; filamentous short tail to the hind wing black tipped with white. Antennæ, head, thorax and abdomen black, the shafts of the antennæ ringed with white, the head between the eyes and behind them white; beneath: the palpi, thorax and abdomen white, the last barred broadly with white on the sides.—♀. Similar to the ♂ but with the black markings on the upper and under sides broader.

Exp. ♂ ♀ 28-34 mm. (1·10-1·34″).

Hab. Peninsular India south of the outer ranges of the Himalayas, except in desert tracts; Ceylon; Assam; Burma; Tenasserim; the Andamans; Nicobars; extending into the Malayan Subregion.

C. rosimon varies both seasonally and locally according to the amount of dryness or moisture, but the variation occurs in the width and not in the actual character or shape of the black markings on the wings. Some specimens taken in the rains in the Andamans in my collection are the darkest I have seen. In these the markings on the upperside of both fore and hind wings have so spread and joined on one to the other that very little of the ground-colour is left. This consists on the fore wing of a broad medial irregularly shaped transverse white mark that extends from vein 6 sinuately to vein 1 and on the hind wing of a transverse narrow medial band of white from vein 7 to the dorsal margin. On the underside the black spots and bands though larger and broader are proportionately not so much broadened as on the upperside. Between the ordinary form and the above described extreme examples all gradations can be found in any long series. The intenseness of the black colour of the markings also varies. In some specimens taken in the hot weather in the dry hot plains of Pegu the colour of the markings is a dull brown both on the upper and under sides.

Larva. "Feeds on *Zizyphus jujuba*, and is of a rough texture as if shagreened all over. It is of the usual woodlouse form, much flattened towards the anal segment which is very broad; head concealed; colour bright green with a double, dorsal, yellow line and the sides powdered with small yellow spots." (*Davidson, Bell & Aitken.*)

Pupa. "Fastened by the tail along a leaf horizontally (the band across the thorax being very lax). It is much contracted at the thorax, while the abdominal portion is large and rounded and much higher than the thorax. It is of a bright green with faint yellow bands on the abdomen and two or three black spots there. It also shows traces of a darker band in the centre of the abdomen." (*Davidson, Bell & Aitken.*)

767. **Castalius ethion**, *Doubleday & Hewitson* (Lycæna), *Gen. Di. Lep.* ii, 1852, p. 490, pl. 76, fig. 3 ♂; *Moore, Lep. Ceyl.* i, 1881, p. 83, pl. 36, figs. 5, 5 *a*, ♂; *de N. Butt. Ind.* iii, 1890, p. 198; *Davidson, Bell & Aitken, Jour. Bomb. N. H. Soc.* x, 1896, p. 380, pl. 4, figs. 4, 4 *a*, larva and pupa.

Race airavati.

Castalius airavati, *Doherty, J. A. S. B.* 1886, p. 261; *de N. Butt. Ind.* iii, 1890, p. 199, frontispiece, fig. 133 ♂.

♂. *Upperside*, fore and hind wings: medially and obliquely crossed by a very broad pure white band that is broadly edged on its inner and outer margins by dark blue and does not extend on the fore wing above vein 6, just above vein 3 it projects outwards for a short distance whence the inner margin of its dark blue edging is carried obliquely to vein 6; the extreme bases of the wings black; the costal margin of the fore and the terminal margins of both fore and hind wings broadly black; on both wings a light iridescent blue suffusion from base outwards. *Underside*: snow-white. Fore and hind wings: the following jet-black markings:—Fore wing: two broad more or less parallel streaks from base extended obliquely to the costa, the outer of the two apically curved and on the costa coalescent with the inner streak; costal margin very narrowly edged with black; an anterior, postdiscal, outwardly oblique, short bar, slightly clavate posteriorly, extends between the costa and vein 5; opposing this there is between the dorsum and vein 3 a similar but erect and apically non-clavate bar; beyond these there is an inner and outer transverse complete subterminal series of spots followed by an anticiliary slender black line; the spots of the inner subterminal series quadrate, of the outer linear, the posterior two of the former very large; lastly, a single detached postdiscal spot in interspace 3 very close to the inner subterminal line of spots. Hind wing: a curved short basal band not extended to the costa, a spot touching it in the middle on the outer side and a discal transverse band twice widely interrupted, the middle portion shifted outwards, the lower portion with a spot on its outer margin joined to it; subterminal and terminal markings as on the fore wing. Antennæ, head, thorax and abdomen black; beneath: the palpi, thorax and abdomen with a median longitudinal white line.—♀. *Upperside*: similar to that of the ♂, but the median white transverse band across both wings broader, extended on the fore wing up to vein 7 and with no inner edging of blue or iridescent light blue irroration; the black at the bases of the wings and on the margins not so intense in shade, more of a brownish black. *Underside*: ground-colour and markings very similar, the basal two oblique bands on the fore wing generally farther from one another than in the ♂.

Exp. ♂ ♀ 28–31 mm. (1·10–1·22″).

Hab. Southern India: the Nilgiris, Travancore; Ceylon; the hills of Assam, Burma, and Tenasserim; extending into the Malayan Subregion.

Larva. "The caterpillar, which feeds on young shoots of *Zizyphus jujuba*, is of the woodlouse form but flattened. Its texture though apparently smooth is, if looked at with a lens, found to be thickly covered with white hairs; its colour is greenish white with a faint green dorsal band." (*Davidson, Bell & Aitken.*)

Pupa. "Similar in shape to that of *C. rosimon*, Fabricius, but smaller and narrower. It is of a bright apple-green with a darkish green line down the centre. There are some small red dots on the edges of the wing-cases." (*Davidson, Bell & Aitken.*)

Race **airavati**, Doherty.—♂. *Upperside*: as in the typical form but the medial white band that obliquely crosses both fore and hind wings is narrower and extends upwards on the fore wing to vein 7; there is no distinct edging on either side of dark blue as there is in the typical form, but the markings of the underside show through by transparency and so give the appearance of an edging which is always more uneven and irregularly white; the suffusion of iridescent light blue on both wings from base outwards is more strongly apparent than in the typical form. *Underside*: ground-colour as in the typical form; the markings also similar in character but all much broader and heavier; on the hind wing the discal band continuous or almost continuous and on both fore and hind wings the inner subterminal series of spots also continuous or nearly so; the spots composing it large and inwardly conical so that it has the appearance of an uninterrupted macular black band the inner edge of which is strongly crenulate. Antennæ, head, thorax and abdomen as in the typical form.—♀. *Upperside*: also differs from that of the typical form in the narrowing of the white band that crosses the wings obliquely, the surrounding black border being very much broader. On the fore wing the band is further narrowed on the outer side posteriorly by the detachment and shifting inwards of a portion of the black edging of the terminal margin, this forms an irregular somewhat rectangular detached spot on the outer side of the white medial band. On the hind wing the white medial band is prominently narrowed anteriorly by the encroachment on it of the inner portion of the black area on the termen. *Underside*: ground-colour and markings similar to that of its own ♂. Antennæ, head, thorax and abdomen as in the ♀ of the typical form.

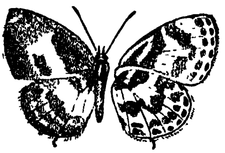

Fig. 91.
Castalius ethion, race *airavati*, ♀.

Exp. ♂ ♀ as in the typical form.

Hab. Great Nicobar Island and also the Central Nicobar Group.

768. **Castalius roxus**, *Godart* (Polyommatus), *Encycl. Méth.* ix, 1823, p. 659; *Horsfield* (Lycæna), *Cat. Lep. Mus. E. I. C.* 1828, p. 70, pl. 2, figs. 4, 4 *a*, ♀, 4 *b*-4 *f*, structure of imago; *Butler, Trans. Linn. Soc., Zool.* (2) i, p. 547; *Elwes & de N. J. A. S. B.* 1886, p. 428; *de N. Butt. Ind.* iii, 1890, p. 199.
Castalius roxana, *de N. Jour. Bomb. N. H. Soc.* x, 1897, p. 633.

♂. *Upperside*: black. Fore and hind wings: obliquely crossed by a broad medial white band that extends from just above vein 5 on the fore to the dorsum of the hind wing; on the fore wing it is shortly produced outwards above vein 3, the apex of this extension square. *Underside*: white suffused slightly with pale yellow, with the following black markings:—a comparatively broad, even, straight band across the base of the hind wing which is continued obliquely on to and across the fore wing to the middle of the costa, there it is joined by a narrow edging on the costal margin to an irregular, upper, discal, outwardly oblique, short transverse bar which is broadest on the costa; posteriorly in a line with this bar is a small, transversely elongate, oval spot in interspace 3 and below *en échelon* with the latter two larger coalescent spots, one above the other, in interspaces 1 and 2; terminal margin with an even transverse band, its inner edge slightly crenulate, medially traversed by a series of minute linear white spots. Hind wing: a transverse, discal, very irregular band widely interrupted in the middle; two coalescent spots beyond transversely across interspaces 4 and 5, followed by a subterminal, complete, curved series of distinct lunules that are edged slenderly on the outer side with white, and a prominent anticiliary white line. Cilia of both fore and hind wings brown; filamentous short tail to latter black tipped with white. Antennæ, head, thorax and abdomen black, the abdomen barred with white on the sides; beneath: the palpi, thorax and abdomen medially white.—♀. Closely resembles the ♂ but on the upperside the medial, broad, oblique white band that crosses the wings is distinctly broader and on the fore wing extends farther towards the costa in a point, while on the hind wing there is in addition, in many specimens, a subterminal complete transverse series of linear white dots. On the underside the black markings are broader; on the fore wing the upper discal short oblique black bar is produced to and coalesces with the black spot in interspace 3; on the hind wing the discal transverse black band is very irregular but nearly continuous by the junction of its upper portion with the spots in interspaces 4 and 5; terminal markings on both wings as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂.

Exp. ♂ ♀ 30-34 mm. (1·19-1·33″).

Hab. Burma; Tenasserim; the Andamans; extending in the Malayan Subregion as far as the Philippines.

Var. *roxana*, de Nicéville, from Upper Burma, seems to me either a casual aberration of *C. roxus* (only two or three specimens have been so far procured), or what I think is more likely, a variety from an arid dry locality at the northern and western limits of its range. It differs on the upperside chiefly by the great width of the white medial band that crosses the wings; on the underside by the narrowness of the black markings. All these are characters that in the allied form *C. decidia* are recognized as appertaining to the dry-season brood of that insect.

769. **Castalius decidia**, *Hewitson* (Lycæna), *Exot. Butt.* v, 1876, Lycæna, pl. 1, fig. 4; *Moore, Lep. Ceyl.* i, 1881, p. 84; *de N. Butt. Ind.* iii, 1890, p. 201; *Davidson & Aitken, Jour. Bomb. N. H. Soc.* v, 1890, p. 353.

Castalius hamatus, *Moore, Lep. Ceyl.* i, 1881, p. 84, pl. 36, figs. 6, 6 *a*.

Castalius interruptus, *de N., J. A. S. B.* 1883, p. 74, pl. 1, fig. 12 ♀.

♂. *Upperside*: dark brownish black, a broad medial oblique white band across both fore and hind wings, not extended on the fore wing above vein 5, above vein 3 produced shortly outwards and downwards into a hook-like form. *Underside*: white with the following black markings:—On fore wing a short, outwardly-pointed, oblique, clavate streak from base joined below to a semicircular broad band that reaches the costa; a short, outwardly oblique, upper discal bar, its outer edge generally emarginate; the apex, the termen narrowly, a large irregular subquadrate spot touching it in the middle and a very large inwardly oblique irregular spot or mark close to the tornus. On the hind wing: a hook-shaped mark at base sometimes slender; an inwardly oblique short clavate bar from apex, three coalescent spots extended outwards from the dorsum above the tornus formed into a sinuate irregular mark; a spot further outwards in interspace 4; a terminal series of slender lunules and an anticiliary fine line. Antennæ, head, thorax and abdomen black; beneath: the palpi, thorax and abdomen white.—♀. Similar to the ♂ on both upper and under sides, but on the former the white medial band is narrower, on the latter the black markings are broader. Antennæ, head, thorax and abdomen as in the ♂.

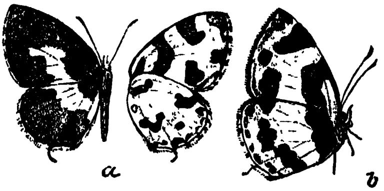

Fig. 92.
a. Castalius decidia.
b. Castalius elna.

Exp. ♂ ♀ 28–35 mm. (1·10–1·36″).

Hab. Sikhim; Malda; Rohilkund; Orissa; Western and Southern India: Bombay, Poona, the Nilgiris, Kanara, Travancore; Ceylon; Assam; Burma.

Var. *hamatus*, Moore, represents specimens taken in localities with constant and heavy rainfall or specimens of wet-season broods.

On the upperside the medial white band is much narrowed; on the underside the black markings larger, broader, some of them generally coalescent.

Var. *interruptus*, de Nicéville, on the contrary is the dry-weather form from localities with a lighter rainfall. In this the white band on the upperside is greatly widened, so that in describing it de Nicéville gave the ground-colour as " white." On the underside the black markings are reduced in size. The variation between typical *hamatus* and typical *interruptus* is very great, but throughout the position and character of the markings do not alter.

Larva. " Feeds on the tender leaves of the 'chorna' (*Zizyphus rugosa*) . . . . pale green, of the usual woodlouse form, with the head concealed under the second segment. The whole body is more or less pubescent and there is a fringe of longer hairs on each side." (*Davidson & Aitken.*)

Pupa. " Short and stout, constricted between the thorax and abdomen, clothed with short hair, closely attached by tail and band to any convenient surface; colour ochreous mottled with brown." (*Davidson & Aitken.*)

770. **Castalius elna**, *Hewitson* (Lycæna), *Exot. Butt.* v, 1876, Lycæna, pl. 1, fig. 8 ♀; *Distant, Rhop. Malay.* 1884, p. 217, pl. 20, fig. 4; *de N. Butt. Ind.* iii, 1890, p. 201.

♂ ♀. *Upperside*: black; a medial broad oblique white band across both fore and hind wings broadening on the latter, on the fore wing it extends further towards the costa in the ♀ than in the ♂ and in most specimens, both ♂ and ♀, it is slightly produced outwards above vein 3. *Underside*: white with the following black markings:—a very broad band, broader than in any of the other forms, from base of hind wing produced obliquely across the fore wing as far as the discocellular veinlets, thence bent at right angles and extended to the costal margin; beyond this the discal markings on both fore and hind wings much as in *C. roxus*, but the terminal markings narrow and more or less obsolescent, the apex of the fore wing however, is more broadly black, while the subterminal line of linear white spots on the same wing and the transverse subterminal series of black lunules on the hind wing are more or less obsolescent. Antennæ, head, thorax and abdomen black; beneath: the shafts of the antennæ speckled with white, the palpi, thorax and abdomen with a longitudinal medial white line, the sides of the abdomen barred with white.

Exp. ♂ ♀ 34–37 mm. (1·33–1·45").

Hab. Sikhim; Bhutan; Orissa; Assam; Burma; Upper Tenasserim; South Andamans; extending to the Malayan Subregion.

The above description is drawn up from specimens that are probably of wet-season broods from Sikhim, Assam and the

Andamans. Dated specimens from Sikhim and Shillong in Assam, taken in February and April respectively, have the median white band that crosses the wings on the upperside extraordinarily broad, while on the underside the terminal markings on the fore and the discal and terminal markings on the hind wing are rusty brown and much blurred.

771. **Castalius manluena**, *Felder* (Lycæna), *Verh. zool.-bot. Ges. Wien*, xii, 1862, p. 484; *Moore, P. Z. S.* 1877, p. 537; *Doherty, J. A. S. B.* 1889, p. 134, pl. 10, fig. 8 ♂; *de N. Butt. Ind.* iii, 1890, p. 200.

"*Female.* Wings very shortly tailed, fuscous brown on both sides; a common, discal, sinuate fascia and marginal spots white. *Underside* with a white vitta at the base of the costa of the fore wing and a common external white fascia inwardly sinuate, outwardly undulate.

"A female much smaller than *L.* (= *C.*) *roxus*, Godart, which appears to be the nearest allied species. The white spots on the margin arranged in rows on the upperside and the absence of the short white band at the base of the costa on the underside of the hind wing, are the only satisfactory distinguishing features of the new species." (*Felder, l. c.*)

"*Male.* Upperside, *both wings* black, with a broad white discal band, extending on the fore wing from the hind margin to above the lower discoidal nervule, just entering the cell, at the end of which it is strongly indented from above; prolonged outwardly between the second and third median nervules; on the hind wing it is broad, strongly produced outwardly, acutely indented inwardly. *Hind wing*: a slender marginal white line, broken at the veins; tips of tail white. *Underside. Fore wing*: ground-colour white, base dark with a longitudinal line close to the costa; a black mass extending obliquely from the base of the hind (inner) margin to the middle of the costa where it joins a broad black subapical area, which extends thence to the second median nervule, thence it is connected (slightly) with the broad submarginal dark band and with an outer discal dark area lying between the 2nd median nervule (vein 4) and the hind margin. *Hind wing*: with a basal black mass embouched with white and a discal band, irregular but unbroken, crossing the wing, and a submarginal line of wide, joined black lunules uniting at the apex with the discal band. Allied to *C. roxus*, Godt." (*Doherty.*)

"*Exp.* ♂ 1·05 inches.

"*Hab.* Nicobars: Kondul; Ikuya, Little Nicobar." (*Doherty.*)

Genus POLYOMMATUS.

Polyommatus, *Latr. Hist. Nat. Crust. Ins.* xiv, 1805, p. 116; *Moore, Lep. Ceyl.* i, 1881, p. 93; *de N. Butt. Ind.* iii, 1890, p. 203.

Type, *P. bœticus*, Linn., from Europe.

Range. Nearly the whole of Europe, Asia and Africa; throughout our limits; extending through the Malayan Subregion to Australia and the Hawaiian Islands.

♂ ♀. Fore wing: costa very slightly arched, nearly straight; apex well-marked but not acute; termen convex; tornus obtuse; dorsum straight; cell not quite half length of wing; veins 6 and 7 closely approximate almost from a point; middle and lower discocellulars attenuate; vein 8 absent, vein 9 from middle of vein 7, veins 10 and 11 from apical half of subcostal; vein 12 bent towards vein 11, very close, touching but not anastomosed; vein 12 long, terminates on costa opposite apex of cell. Hind wing: costa slightly arched; apex rounded; termen rather straight especially in the ♀, in the ♂ slightly convex; tornus well-marked, angulate, dorsum rather long; cell very short, not nearly half length of wing; middle and lower discocellulars attenuate; veins 3 and 4 from lower apex of cell, vein 7 from only a little before upper apex of cell; vein 8 strongly arched at base, terminating on costal margin well before apex of wing. Antennæ short, not quite half length of fore wing, club long and gradual, pointed at apex; eyes hairy; palpi porrect or subporrect, fringed anteriorly; third joint rather short, bare, aciculate; body comparatively robust.—♂. Sex-mark: fore and hind wings thickly overlaid with hair-like scales that give a frosted appearance to the upperside; underside fore wing: a patch of specialized scales at bases of interspaces 2 and 3.

772. **Polyommatus bœticus**, *Linn.* (Papilio) *Syst. Nat.* ed. xii, i, 1767, p. 789; *Godart, Encycl. Méth.* ix, 1823, p. 653; *Moore, Lep. Ceyl.* i, 1881, p. 93; *Distant, Rhop. Malay.* 1884, p. 214, fig. 64, neuration fore wing, & p. 230, pl. 20, figs. 1, 8, ♀ ♂; *de N. Butt. Ind.* iii, 1890, p. 204, pl. 27, fig. 190 ♂.

♂. *Upperside*: violet-blue, the wings covered with white scale-like hairs over the ordinary scaling, which gives them a frosted appearance. Fore wing: costa very narrowly, termen evenly and more broadly brown. Hind wing: costa and apex broadly, termen very narrowly brown; interspaces 1 and 2 with more or less rounded subterminal black spots, each surrounded by an obscure ring of bluish of a shade lighter than the ground-colour. Cilia of both fore and hind wings silvery white, with a brown line along their bases that stops short before the tornal angle of the hind wing; tail black tipped with white. *Underside*: pale greyish or brownish ochraceous. Fore wing: transversely crossed by the following more or less parallel pale brown fasciæ:—four across the cell, not extended above or below it, five beyond; the first two of the latter group broken at veins 2 and 3, the lower portions shifted inwards out of line with the upper portions, the next short, not extended below interspace 3 and narrowed to a point posteriorly; the subterminal two entire, curved, the outer one macular. None of the fasciæ extend quite up to the costa. Hind wing: transversely crossed before the terminal markings by eight or nine pale brown fasciæ similar to those on the fore wing but more or less fused and broken and the inner ones posteriorly curved upwards; these are followed by a comparatively broad band of the ground-colour, an inner subterminal pale brown broad fascia and an outer series of similarly-coloured spots; these markings posteriorly interrupted by a black spot in interspace 1 and another in interspace 2, the latter inwardly margined with ochraceous; both spots with superposed metallic bluish-green scales. Antennæ, head, thorax and abdomen brown; the shafts of the antennæ ringed with white, the thorax with some bluish-white pubescence; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: brown; in some specimens with, in others without, some iridescent bluish scaling at the bases of the wings which sometimes extends outwards towards the disc. Fore wing: anticiliary black lines, and in a few specimens traces of an inner subterminal series of bluish spots in the interspaces more obvious posteriorly than anteriorly. Hind wing: a postdiscal transverse pale fascia, often absent and always more obvious anteriorly than posteriorly, followed by a subterminal series of white-ringed spots, the posterior two of which are jet-black and always present; the anterior spots brown, of a shade slightly darker than the ground-colour and not always present, though in most specimens fairly well indicated; lastly, a prominent anticiliary black line. Cilia of both fore and hind wings white with a line of brown along their bases. *Underside*: as in the ♂. Antennæ, head, thorax and abdomen similar to those of the ♂ but paler on the upperside.

Exp. ♂ ♀ 34–38 mm. (1·25–1·40″).

Hab. That of the genus, of which it is the sole representative.

Larva. "When full-grown measures $\frac{7}{18}$ of an inch in length; pale, dull green throughout, slightly shagreened but not hairy except slightly so at the sides; the small retractile head smooth, ochreous pale brown, shining; a dorsal line of a somewhat darker green than the ground (colour), no other markings whatever, altogether a very plain looking creature. The constrictions at the segments shallow, the spiracles black but inconspicuous, the usual extensile organs on the twelfth segment very short. Larva feeds on the yellow pea-like flowers and on the pods of *Crotalaria striata*, DC., in Calcutta. Dr. A. Forel, of Geneva, has identified the three species of ants which I have found attending this larva in Calcutta as *Camponotus rubripes*, Drury (*sylvaticus*, Fabr.), subspecies *compressus*, Fabr., *Tapinoma melanocephalum*, Fabr., and *Prenolepis obscura*, Mayr (var. *clandestina*, Mayr)."—(*de Nicéville.*)

Pupa. "Pale yellowish green, the posterior end very blunt and rounded; the abdominal segments larger than the anterior, the head small, a dark dorsal line, a double subdorsal series of small black spots, the thorax slightly humped on the back; the pupa smooth throughout." (*de Nicéville.*)

The next two Subfamilies are monotypic. The forms arranged under them are curiously isolated, with no close affinity either to each other or to the rest of the *Lycænidæ*. De Nicéville placed *Curetis*, the sole genus of the *Curetinæ*, after *Arhopala* and *Mahathala* and before *Thecla*, but it seems to me that this interrupts the close affinity between the *Arhopalinæ* and the *Theclinæ*, which, in my opinion, is closer than between the *Lycæninæ* and *Arhopalinæ*. I therefore provisionally place the *Curetinæ* after the *Lycæninæ*.

The Subfamily *Liphyrinæ* is represented by one form only, *Liphyra brassolis*. This insect, though placed in the *Lycænidæ*, is so extraordinarily abnormal in the larval and pupal states and in the appearance of the imago, that it is impossible to guess even to what form or genus it is most nearly allied, but it seems to me to come most suitably after *Curetis*. Vein 7 of the fore wing in both sexes ends below the apex on the terminal margin as in *Curetis*.

Subfamily III. CURETINÆ.

Egg. "An oblate sphere flatter below than above, or turbinate, being shaped like many *Echini*, covered with a very coarse hexagonal reticulation, the apex of the egg having a deep central depression." (*de Nicéville.*)

Larva. When full-grown about $\frac{11}{16}$ of an inch in length. Head completely hidden and even when the animal eats it is not visible from above, the second segment entirely enclosing it. The second segment is half as wide as the following, the third, fourth and fifth rapidly and progressively enlarging, the next three segments as rapidly decreasing in size, the remainder subequal. The twelfth segment bears two most extraordinary structures, which consist of two diverging cylindrical rigid pillars arising from the subdorsal region; when the insect is touched or alarmed, from each pillar is everted a tentacle as long as the rigid pillar, bearing at its end long hairs. The tentacle, with its long hairs spread out like a fan or rosette, is whirled round with great rapidity in a plane parallel to the body, its use being almost certainly to frighten away its enemies, as this larva is not attended by protecting ants and lacks the honey-gland on the eleventh segment present in so many Lycænid larvæ which are affected by ants. (*After de Nicéville.*)

Pupa. Like a lump of jelly. Wing-cases quite smooth, rest of the pupa covered with tiny pits giving it a rough appearance.

It is entirely without angulations or processes, its widest portion is the very broad and flat base on which it rests; its length is about $\frac{7}{16}$ of an inch, breadth $\frac{5}{16}$, height $\frac{2}{16}$, the anal end produced into an obtuse point. Divisions between the segments hardly visible. (*After de Nicéville.*) *

Imago. Robust in form and structure; wings short and broad, indicating rapid powers of flight; body comparatively massive; legs stout. Colouring on the upperside throughout the subfamily: males coppery red of various shades with black edgings, females white with similar black borders to the wings; beneath: both sexes silvery white.

Genus **CURETIS.**

Curetis, *Hübner, Verz. bek. Schmett.* 1816, p. 102; *Moore, Lep. Ceyl.* i, 1881, p. 73; *de N. Butt. Ind.* iii, 1890, p. 284.
Anops, *Boisduval, Spec. Gén. Lép.* i, 1826, pl. 23, fig. 1.

Type, *C. æsopus*, Fabr. (= *thetis*, Cramer), from India.

Range. Indo-Malayan Region.

♂ ♀. Fore wing: costa arched; apex acute, in some forms or varieties slightly produced, falcate; termen comparatively very long, giving great breadth to the wing, straight, sinuate or concave, never oblique; tornus formed into a right angle, the angle clear cut, acute; dorsum slightly sinuate, about three-fourths the length of the costa; cell about half length of wing; vein 7 from before upper apex of cell, upper discocellular therefore in line with and forming part of subcostal vein, middle and lower discocellulars obsolescent; vein 3 from before, vein 4 from lower apex of cell; vein 5 at base midway between veins 4 and 6, not closer to 6 than to 4; vein 6 from upper apex of cell; vein 7 ends on termen below apex of wing; vein 8 absent; vein 9 from apical half of 7; veins 10 and 11 free, from apical half of subcostal; vein 12 terminates on costal margin nearly opposite upper apex of cell. Hind wing: costa arched; apex blunt; termen rounded, sometimes strongly angulate in the middle, the posterior half then more or less concave; tornus more or less produced, the angle sometimes rounded sometimes acute; dorsum long, very slightly convex; cell about half length of wing; middle and lower discocellulars obsolescent, oblique; veins 3 and 4 closely approximate at base, from lower apex of cell; vein 8 very strongly curved at base, terminates at apex of wing; costal margin above vein 8 near base of wing very broad, humeral angle broadly rounded. Antennæ short, not half length of fore wing, without a distinct club, very gradually incrassate, bluntly rounded at apex;

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* The above is taken almost verbatim from de Nicéville's description of the larva and pupa of *Curetis thetis*, Drury, the colouring only being left out. This I have noted under the description of the form. The structure of the larva and pupa of *C. bulis*, var. *malayica*, Felder, which I have myself reared, is very similar, the differences I have noted under the description of that form.

palpi porrect, densely clothed in front with short scales not fringed with hairs, third joint thick and short in the ♂, longer in the ♀; eyes hairy.

The forms arranged under this genus are very puzzling, and until extensive breeding experiments are undertaken it will be impossible to attain any certainty as to whether there are two or a dozen distinct forms. This difficulty is especially felt when dealing with the females of the forms in any large collection, and personally I have only tentatively managed to pair many specimens. The males it is possible, following de Nicéville, to sort more or less satisfactorily into two groups. I have, therefore, provisionally adopted an arrangement under two forms, *C. thetis*, Drury, and *C. bulis*, Doubleday and Hewitson.

Key to the forms of Curetis *.

A. ♂ ♀. Underside fore wing: discal and subterminal markings or bands parallel, not anteriorly convergent.
  a. ♂. Upperside hind wing: terminal black border very narrow, almost linear.
    a'. ♂. Upperside fore wing: costal and terminal black borders form an acute angle at junction opposite apex of wing...... *C. thetis*, p. 437.
    b'. Upperside fore wing: costal and terminal black borders form an even curve at junction opposite apex of wing........ *C. thetis*, var. *arcuata*, p. 439.
  b. ♂. Upperside hind wing: terminal black border broader, not linear.
    a'. Of large size, expanse 56–60 mm. ♂. Upperside fore wing: black area at apex very broad, occupies much more than one-third of the wing................ *C. thetis*, var. *gloriosa*, p. 440.
    b'. Of smaller size, expanse 48–52 mm. ♂. Upperside fore wing: black area at apex proportionately not so broad, occupies about one-third of the wing.......... *C. thetis*, var. *saronis*, p. 440.
B. Underside fore wing: discal and subterminal markings or bands anteriorly convergent.
  a. ♂. Upperside fore wing: terminal black border extended along dorsal margin.

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* De Nicéville takes the extension or non-extension along the dorsal margin of the terminal black border on the upperside of the fore wing as a definite marking by which the two groups of *Curetis* can be distinguished one from the other, but that character does not apply to the females. The markings on the underside, on the contrary, though often indistinct, are always traceable, and *they* apply to both sexes. For the rest, de Nicéville's synopsis of the characters that distinguish the various named forms (?) or varieties (?) is the best short presentment of the differences that exist between what may be mere varieties, or again may hereafter take specific rank. I have, therefore, largely taken advantage of it, adapting the terminology to that used in the present work.

- a'. Fore wing: acuminate; hind wing strongly curved or slightly angulate in the middle.
  - a^2. Upperside fore wing: discocellulars not marked with a transverse black spot or short line .... *C. bulis*, p. 441.
  - b^2. Upperside fore wing: discocellulars marked with a transverse black spot or short line...................... *C. bulis*, var. *dentata*, p. 443.
- b'. Fore wing: highly acuminate; hind wing: termen strongly angulate in the middle *C. bulis*, var. *angulata*, p. 443.
- c'. Fore wing: acute; hind wing: termen evenly rounded.
  - a^2. ♂. Upperside fore and hind wings: medial red areas large .... *C. bulis*, var. *malayica*, p. 444.
  - b^2. ♂. Upperside fore and hind wings: medial red areas smaller .... *C. bulis*, var. *stigmata*, p. 446.
  - c^2. ♂. Upperside fore and hind wings: medial areas reduced to a small discal patch on each wing................ *C. bulis*, var. *discalis*, p. 446.

b. ♂. Upperside fore wing: terminal black border ended at tornus, not continued along dorsal margin.................... *C. bulis*, var. *felderi*, p. 447.

773. **Curetis thetis,** *Drury* (Papilio), *Ill. Exot. Ent.* ii, 1773, p. 16, pl. 9, figs. 3, 4, ♀; *de N. Jour. Bomb. N. H. Soc.* iii, 1888, p. 164, pl. 26, larva, pupa and tentaculum; *id. Butt. Ind.* iii, 1890, p. 287.

Anops thetys, *Moore, Cat. Lep. Mus. E. I. C.* i, 1857, p. 52, pl. 12, figs. 5, 5 *a*, larva* & pupa; *id.* (Curetis) *Lep. Ceyl.* i, 1881, p. 74, pl. 34, figs. 2, 2 *a*, ♂ ♀.

Papilio phædrus, *Fabr. Sp. Ins.* ii, 1781, p. 125; *de N.* (Curetis) *Butt. Ind.* iii, 1890, p. 286.

Curetis saronis, *Moore, P. Z. S.* 1877, p. 587; *W.-M. & de N., J. A. S. B.* 1886, p. 364; *de N. Butt. Ind.* iii, 1890, p. 289.

Curetis gloriosa et arcuata, *Moore, P. Z. S.* 1883, pp. 522, 523, pl. 48, fig. 1 ♂ & fig. 3 ♂; *de N. Butt. Ind.* iii, 1890, p. 289.

♂. *Upperside*: dark cupreous red, glossy and shining. Fore wing: base irrorated with dusky scales; costa edged with a narrow, inwardly jagged, jet-black band that broadens to the apex, thence continued along the termen, decreasing in width to the tornus; opposite the apex the inner edge of the black is acutely angulate. Hind wing: base and dorsum broadly but slightly irrorated with dusky scales; costa narrowly, dorsal margin more broadly pale; termen very narrowly and evenly margined with black. *Underside*: shining silvery white. Fore and hind wings crossed transversely by discal and inner subterminal, somewhat lunular dark lines and a more or less obsolescent outer subterminal line of minute dark dots. These markings generally very indistinct but traceable; in some specimens more clearly defined but never prominent. Antennæ, head, thorax and abdomen dusky black; the antennæ reddish at apex; in some specimens the head, the thorax laterally and the base of the abdomen brownish mouse-colour; beneath: the palpi, thorax and the basal half of the abdomen medially silvery white, the sides and apex of the abdomen dusky black.—♀. *Upperside*: fore wing dark brownish-black; a large medial patch that extends from vein 1 to vein 4, enters the lower half of the cell and extends from base outwards for about two-thirds the length of the wing, white; at the base of the wing this patch is shaded and obscured for a short distance by dusky black. Hind wing: pale dusky black; a darker, short, broad brownish-black streak from base along the subcostal vein, that outwardly broadens into an irregularly round patch beyond which is a broad short upper discal white band with ill-defined and somewhat diffuse margins. Cilia, fore and hind wings: white. *Underside*: as in the ♂ but the markings still more indistinct, and in no specimen that I have seen is there any trace of the outer subterminal line of dark dots.

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* The colour and markings of the larva as figured do not agree with de Nicéville's description of the same as reared by him in Calcutta, but, except that the red markings are too bright and too broad, Moore's figure of the larva closely resembles the larva of *C. bulis*, var. *malayica*, Felder, obtained by me in Burma.

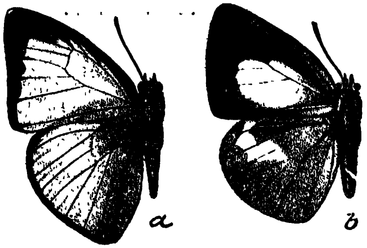

Fig. 93.—*Curetis thetis*.
a. Male. *b*. Female.

Exp. ♂ ♀ 41–45 mm. (1·62–1·78″).

Hab. Peninsular India, south of the Himalayas, but not in the desert tracts or in areas with a scanty rainfall; Ceylon; parts of Assam; Upper Burma; Java.

Larva. “On emergence eats a hole through the top of the egg about equalling one-third of its surface and crawls out. The empty shell has a close superficial resemblance to an echinus shell. In colour pale ochreous, furnished with long stout white hairs of which a subdorsal series is on each side, with one long hair springing from the apex of each tubercle; there are, besides, other lateral series and numerous hairs projecting forwards in front of the head and backwards over the anal segment. The full-grown larva is the most beautiful known to me among the *Lycœnidœ* . . . . . of the exact shade of green of the leaves on which it feeds . . . . . The second segment is quite unmarked; the third to the thirteenth have a subdorsal series of short oblique pale yellowish-green lines between which the ground-colour is paler than the rest of the body; there is a dark green dorsal line; on each side of the ninth segment there is a prominent pure dead-white, somewhat diamond-shaped mark." (*de Nicéville.*) Mr. de Nicéville goes on to say that the sheaths of the tentacles on the twelfth segment are pale green, the tentacles themselves maroon, the whorl of hairs at their apices white with their basal thirds black.

Pupa. Light green; wing-cases bluish green. "There is a conspicuous heart-shaped pale ochreous mark on the top of the thorax, the pits on it filled in with reddish pigment." (*After de Nicéville.*)

C. phœdrus, Fabr., varies so little from *thetis* as to be scarcely ranked even as a variety. On the whole the ground-colour on the upperside in *C. phœdrus* is of a duller red and the costal and terminal black bands on the fore wing narrower than in typical *thetis*.

With regard to *C. œsopus*, Fabr., that also falls as a synonym of *C. thetis*, as acknowledged by Fabricius himself. The type, a ♀, is in the Banksian collection now in the British Museum, and is undoubtedly a ♀ of ordinary *C. thetis*, Drury.

Var. *arcuata*, Moore, differs from typical *thetis* as follows:—

♂. *Upperside*: ground-colour similar but of a slightly paler shade in all the specimens I have seen. Fore wing: costal and terminal margins edged more broadly with black than in *thetis*, the inner margin of this colour forms a regular strongly curved arch from base of wing to tornus, not angulate at all opposite apex of wing, the edging on the costal margin not jagged on the inner side. Hind wing: the costal margin not pale but somewhat broadly dusky black; the terminal black edging broader than in *thetis*, not linear, produced for a very short distance up each vein. The irroration of dusky scales at the bases of both fore and hind wings and along the dorsal area of the hind wing heavier and more broadly diffused, especially on the latter. *Underside*: as in the typical form. Antennæ, head, thorax and abdomen similar.—♀. *Upperside*: ground-colour darker brownish-black, deep opaque black on the costa, apex and termen of the fore wing; the medial oval white patch on the fore wing smaller, the upper discal white band on the hind wing narrower, the short, broad black streak from base terminates in a large round spot or patch inwardly merged in the ground-colour which fills the whole area of the cell. *Underside*: as in the typical form. Antennæ, head, thorax and abdomen similar.

Exp. ♂ ♀ 38–43 mm. (1·48–1·70").

Hab. Described originally from Malabar; de Nicéville gives it from Bangalore, Ratnagiri, North Kanara and the Malda district; I have it from the Anaimalai Hills.

? Var. *gloriosa*, Moore, resembles var. *arcuata*, but both males and females run distinctly larger, and the ♀ is differently coloured from the ♀ of either *thetis* or of *thetis* var. *arcuata*; it is quite possibly a good form, distinct from either of the above.

♂. *Upperside*: ground-colour as in *thetis*, but of a distinctly richer deeper coppery-red. Fore wing: the black area on the costal and terminal margins as in *thetis* var. *arcuata* but broader. the inner edge of the area roundly curved as in that form. Hind wing: also much as in var. *arcuata*, but the terminal black edging broader, inwardly somewhat diffuse in many specimens. *Underside*: as in typical *thetis*, but in most specimens the markings more distinct and, in one or two procured by me in Burma, the transverse discal band in both fore and hind wings is edged outwardly by a series of slender black lunules. Antennæ, head, thorax and abdomen dark brownish black, the sides of the thorax with reddish-brown pubescence, the sides of the abdomen with very dark reddish scales; beneath: the antennæ dark ochraceous, the palpi, thorax and base of the abdomen silvery white, apical half of the abdomen dusky brownish.—♀. *Upperside*: ground-colour and shape of markings as in *thetis*, but the white areas on both fore and hind wings replaced by shining orange-yellow, the medial orange area on the fore wing larger than the corresponding white area on the fore wing of *thetis* ♀. Moreover, on the posterior half of the hind wing the long golden-yellow hairs give a distinct subtone of yellow to that portion. *Underside* as in *thetis* but the markings more distinct; the transverse discal band on both fore and hind wings as in its own ♂, often edged with well-defined slender black lunules and the outer subterminal line of minute black dots also well defined.

Exp. ♂ ♀ 50–54 mm. (1·98–2·14″).

Hab. Assam: Sylhet; Burma; Tenasserim.

? Var. *saronis*, Moore.—♂. *Upperside*: ground-colour as in var. *gloriosa*. Fore wing: black edgings on the costal and terminal margins as broad as in that form or broader, but the inner margin of the black area not so evenly curved, in some specimens slightly scalloped, in others slightly jagged. Hind wing: costal and terminal margins more broadly black than in any other variety or form of *thetis*; the long soft hairs that clothe the posterior portion of the wing a soft shining pale brown. In most specimens, both on the fore and hind wings, the black on the terminal margins is produced inwards along the veins for a short distance. *Underside*: silvery white as in *thetis*; the markings generally very indistinct, except that in most of the specimens that I have seen the faintly marked discal band on both fore and hind wings has a more clearly defined outer edging of slender black lunules and the outer subterminal series of black dots is also fairly clearly marked. Antennæ, head, thorax and abdomen dark brown, the apex of the antennæ and the sides of the abdomen reddish; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: dark brown, darker on the fore than on the hind wing. Fore wing: a comparatively small medial diffuse spot or patch of golden yellow that occupies the lower apex of the cell and the bases of interspaces 2 and 3, but spreads diffusely inwards and merges into the shade of the ground-colour. Hind wing: the broadly clavate dark streak from base very faintly marked and not very clearly differentiated from the brown ground-colour

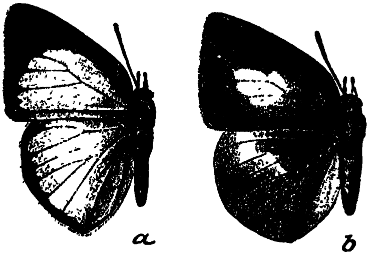

Fig. 94.—*Curetis thetis*, var. *saronis*.
a. Male. *b*. Female.

beyond it; an upper discal, diffuse, short, curved, whitish band that posteriorly shades obscurely into golden yellow on the disc. This tinge of golden yellow is very variable; in some specimens it is reduced to a touch of that colour along those portions of veins 5 and 6 just beyond the cell; abdominal fold earthy-brown. *Underside*: similar to that of its own ♂. Antennæ, head, thorax and abdomen brown, the apex of the antennæ red; beneath: the antennæ pale brown; palpi, thorax and abdomen red.

Exp. ♂ ♀ 43–47 mm. (1·70–1·85").

Hab. Assam: Cachar (*de Nicéville*); the Nicobar and Andaman Islands.

774. **Curetis bulis**, *Doubleday & Hewitson* (Anops), *Gen. Di. Lep.* ii, 1852, p. 473, pl. 75, fig. 5 ♂; *Moore* (Anops), *Cat. Lep. Mus. E. I. C.* i, 1857, p. 53; *de N. Butt. Ind.* iii, 1890, p. 293.
Anops malayica, *Felder*, *Novara Reise, Lep.* ii, 1865, p. 221, pl. 28, fig. 18 ♂; *Moore* (Curetis), *Jour. Linn. Soc., Zool.* xxi, 1886, p. 39; *de N. Butt. Ind.* 1890, p. 294.
Curetis dentata, discalis et stigmata, *Moore*, *P. Z. S.* 1879, pp. 137 & 138; *de N. Butt. Ind.* iii, 1890, pp. 293 & 295.
Curetis angulata, *Moore*, *P. Z. S.* 1883, p. 522, pl. 48, fig. 2 ♂; *de N. Butt. Ind.* iii, 1890, p. 292.

Curetis felderi, *Distant, Rhop. Malay.* 1884, p. 203, pl. 24, fig. 3 ♂, pl. 22, fig. 26 ♀; *de N. Butt. Ind.* iii, 1890, p. 290.

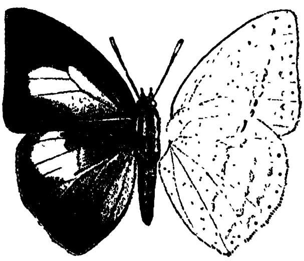

Fig. 95.—*Curetis bulis*, ♂.

♂. *Upperside*, fore wing: velvety black, an elongate broad medial patch dark orange-red, that extends from base outwards for about three-fourths the length of the wing and fills the area from vein 1 to the middle of the cell; in some specimens diffusely, spread below vein 1 near base, but there shaded with dusky black; the outer margin of this red patch unevenly rounded. Hind wing: brownish black, a large orange-red spot above vein 3 to near apex, inwardly extended into the cell to near the base of the wing and posteriorly diffuse below vein 3, but in the cell thickly overlaid with dusky-black scaling and posteriorly shaded with long brown hairs that in certain lights take a golden tint; above the cell extended from the base of the wing to the inner margin of the orange spot is a prominent broad streak of a shade darker than the ground-colour; abdominal fold pale pinkish brown. *Underside*: silvery white with sparsely scattered minute black dots. Fore wing: a discal and inner subterminal series of very indistinct somewhat lunular black markings that form broken anteriorly convergent bands *, which are continued over the hind wing to the tornus; beyond these, on both fore and hind wings, succeeds an outer subterminal series of minute black dots, in most specimens very indistinct. Antennæ, head, thorax and abdomen dark brown; sides of the abdomen golden brown; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: more or less as in the ♂, but the dark orange-red medial patches replaced by white and much larger. On the fore wing this white patch extends above the cell, the discocellulars closing which are prominently marked by a black tooth, and posteriorly it reaches the dorsal margin. On the hind wing the white patch is very large and in some specimens very diffuse. Both fore and hind wings are shaded at the base by dusky scales and in many specimens the markings of the underside are plainly visible by transparency: the broad black streak above the cell on the hind wing is present in some, absent in other specimens. *Underside*: ground-colour and markings as in the ♂, but much more prominent.

Exp. ♂ ♀ 46–50 mm. (1·82–1·98″).

Hab. Himalayas: from Kumaon to Bhutan; Central India: Pachmari; Southern India: the Wynaad; Assam: Sylhet; Upper Burma: Maymyo, 3000 feet.

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* For purposes of process-reproduction these markings have been much emphasized in all the figures; actually they are often only just traceable.

? Var. *dentata*, Moore.—*Upperside*: golden or coppery orange of a shade paler than the orange patch in the typical form. Fore wing: costal margin broadly black, the width of the black colour increasing to the apex and continued from below that in an even border along the termen to the tornus, thence along the apical third of the dorsum, ending more or less diffusely in a point; discocellulars marked by a prominent tooth extended from the black costal border. Hind wing: base and dorsal area lightly irrorated with fuscous scales, the latter also shaded with long pale brown hairs; termen with a blackish border of varying width but generally widest in the middle, its inner margin more or less diffuse; costal margin broadly pale yellow. *Underside*: silvery white; markings similar to but in some specimens even more indistinct than in *bulis*. Antennæ, head and thorax of a paler brown than in *bulis*; sides of the abdomen golden yellow; beneath: palpi, thorax and abdomen white.—♀. *Upperside*: similar to that of the ♂, but the orange replaced by white, the black costal and terminal borders on the fore wing broader; on the dorsal margin the border is continued further towards the base; the discocellular black tooth-like mark as prominent as in the ♂. Hind wing: the white area very much smaller than the similar orange area on the hind wing of the ♂ and confined to the apical third of the wing; a short, broad, clavate, black streak extends from the base outwards above the cell. *Underside*: as in the ♂ but the markings more prominent.

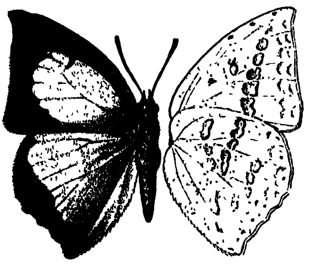
Fig. 96.—*Curetis bulis*, var. *dentata*, ♂.

Exp. ♂ ♀ 46–49 mm. (1·82–1·92″).

Hab. Himalayas: Mussoorie to Sikhim; Central India: Pachmari; Southern India: the Wynaad; Assam; Burma.

? Var. *angulata*, Moore.—Differs from *bulis* in the shape of the hind wing, which has the termen very strongly angulate in the middle in both sexes. In both ♂ and ♀ also the apex of the fore and tornal angle of the hind wing are highly acuminate, in the fore wing the apex is, in most specimens, falcate.—♂. *Upperside*: differs from the upperside of the typical form in the greater extent and paler colour of the orange-red areas on both fore and hind wings. On the fore wing the discocellulars are marked by a black tooth as in var. *dentata*, and on the hind wing the orange-red ground-colour extends posteriorly to vein 2, but along the dorsum it is heavily shaded with dusky-black scales. *Underside*: as in typical *bulis*. Antennæ, head, thorax and abdomen black, the sides of the abdomen not reddish or golden; beneath: palpi, thorax and abdomen white.—♀. *Upper* and *undersides*: similar to those of the ♂, but the ground-colour on the upperside white,

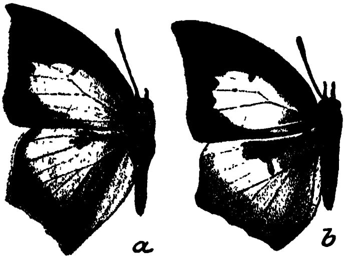

Fig. 97.—*Curetis bulis*, var. *angulata*.
a. Male. *b*. Female.

not orange, the costal and terminal black borders on both fore and hind wings broader.

Exp. ♂ ♀ 43–48 mm. (1·70–1·88″).

Hab. Himalayas: Mussoorie; Sikhim; Central India; Assam; Burma.

? Var. *malayica*, Felder.—*Upperside*, fore wing: closely resembles that of typical *bulis*, but the medial orange-red area is larger and extends slightly further outwards, upwards and downwards so that the black on the tornal area forms a broad triangle and is continued along the dorsal margin, narrowing to a slender line near the base of the wing; anteriorly the black border along the costa projects as a slender black tooth along the discocellulars, which however, is absent in many specimens. Hind wing: the orange-red area that in *bulis* forms an upper discal patch, in this variety or form spreads inwards to the base, posteriorly towards the tornus and leaves only a comparatively narrow terminal margin; the tornal area broadly black, the inner margin of the black very diffuse, rarely so clearly defined as in Felder's figure;

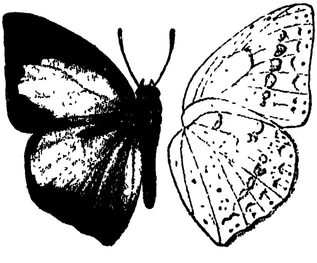

Fig. 98.—*Curetis bulis*, var. *malayica*, ♂.

near the base, above the subcostal vein, there is a short, broad, black streak; abdominal fold pale greyish white. *Underside*: silvery white, the markings faint and ill-defined as in all forms of *Curetis*; the discal oblique band of the fore wing carried over the hind wing, but not in any specimen that I have seen continued in even a disjointed line (as in *bulis*) to the tornal angle. The rest as in typical *bulis*. Antennæ, head, thorax and abdomen similar to those of *bulis*.—♀. Very similar to that of *bulis*. Differs on the upperside, in some specimens only, by the extent of the white area on the hind wing, which spreads practically over the whole wing, but is heavily shaded along the terminal margin and posteriorly on the dorsal area with dusky brownish-black or fuscous. On the underside the ground-colour and markings are as in *bulis*. Antennæ, head, thorax and abdomen similar to those of *bulis*.

Exp. ♂ ♀ 45–50 mm. (1·73–1·98″).

Hab. Malacca; extending into Southern Tenasserim; Sikhim (*Elwes & de Nicéville*).

With regard to the larva I made the following note as far back as 1891:—Mergui, 5th May, 1891. While passing through the forest on the road to the Mergui plantations I saw a white female *Curetis* fluttering over the leaves of a small Thin-win (*Pongamia glabra*, Vent.). Thinking she was ovipositing I approached and carefully searched the leaves for eggs, but failed to find any. On the leaves of a branch on the other side of the same tree however, I found two small green larvæ with crimson markings. Each bore towards the anal end a pair of dark green erect horns. On trying to break off the leaves on which they were feeding, the caterpillars protruded a brown tentacle from each horn, crowned with a tuft of black and white hairs; these tentacles were whirled round rapidly for a second or two and then withdrawn, and every time afterwards when the leaf was moved or handled the action was repeated. The same thing occurred if the larva was touched or breathed upon. I took the larvæ back to camp and reared them, supplying them with the youngest and tenderest leaves of the Thin-win, which they riddled into holes along the midrib. Three

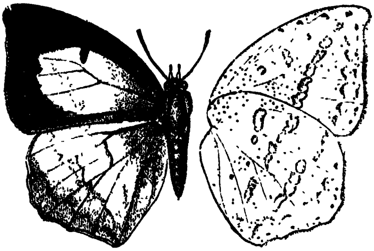

Fig. 99.—*Curetis bulis*, var. *malayica*, ♀.

days afterwards both turned into very extraordinary-looking pupæ, and the perfect insects emerged, one on the fifth, the other on the seventh day after pupating. At the time I took them for males of *Curetis bulis*, Doubleday & Hewitson; but subsequently, when I showed them to Mr. de Nicéville, he said they were closer to *Curetis malayica*, Felder. The following description, taken from the living larva and pupa, was drawn up by me at the time:—

Larva. About 16 mm. long. Colour velvety green; head dark brown; 3rd and 4th segments with narrow, obliquely-placed lateral stripes of crimson, edged posteriorly with yellow; 6th to 11th segments with a slender longitudinal dorsal stripe of the same colour; the spiracles on each side surmounted by a slender, lunulated, pale yellow line; on the 9th segment a conspicuous quadrate patch of white between the spiracular yellow lunule and the crimson dorsal line; 12th and remaining segments dark green; on the 12th two greenish-yellow, erect, rigid processes slightly divergent at their apices; the tentacles protruded from their processes seem to be pinkish brown in colour, with a tuft of black and white hairs at their apices; but it is not easy to note the colour of the hairs, as they are protruded, whirled round and withdrawn with great rapidity. There is no opening or honey-gland on the 11th or other segment, as in many Lycænid larvæ. In shape also these do not resemble the larvæ of the *Lycænidæ*, which as a rule, are onisciform. In these the head is small and almost always completely hidden under the 2nd segment; the 3rd, 4th, and 5th segments sloped upwards posteriorly, form each a well-marked transverse ridge.

Pupa. A rounded slightly convex disc with a protrusion posteriorly; colour translucent dark green. Seen under a magnifying-glass they seem to be studded with tiny pits, except on the lateral areas; on the anterior portion there is an oval yellowish-white mark.

Var. *stigmata*, Moore.—♂. *Upperside*: very like that of typical *C. bulis*, but the ground-colour a shade darker. Comparing the specimens that answer to Mr. Moore's very short description with the type of *bulis* in the collection of the British Museum, I find that the red medial areas on the wings, especially that on the hind wing, are not quite so broad. As in the typical form, the discocellulars on the upperside of the fore wing are covered by the very broad black edging to the costal margin. *Underside*: indistinguishable from the underside of the typical form.—♀. Unknown, but probably very similar to the ♀ of the typical form.

Exp. ♂ as in *bulis*.

Hab. Originally described from Tenasserim.

Var. *discalis*, Moore.—"Male distinguished on the upperside by the bright red of the fore wing being confined to a narrow elongated patch and that on the hind wing also confined to a small oblong lunular discal patch which is slightly dentate on the middle of its inner border. Fore wing: somewhat short and truncate." (*Moore.*)

Exp. "♂ 1⅜″."

Hab. Nepal; Darjeeling.

With regard to this variety Mr. de Nicéville says:—"I possess numerous specimens of this form from Sikhim and find that there it gradually and by imperceptible steps grades into *C.* ***bulis***, Doubleday & Hewitson." With this I entirely agree.

The next described variety or form may or may not be distinct. I doubt its occurrence within our limits, but as Moore gives it from Mergui I have followed de Nicéville in including it in the fauna dealt with in this series of handbooks. According to Distant's figure of the ♂ (Rhop. Malay. pl. 24, fig. 3) it comes into the ***bulis*** group, as it has the discal and inner subterminal markings on the underside of the fore wing convergent anteriorly. At the same time I have seen no specimen like the one figured, for combined with the markings of the underside as noted above, the black border on the upperside of the fore wing is not continued along the dorsal margin but ends at the tornus as in the *thetis* group. So far as the colouring of the upperside goes it can be matched exactly by many specimens of *C. thetis* var. ***saronis***, Moore, from the Nicobars, with one variety of the ♀ of which, the ♀ *felderi* figured by Mr. Distant (Rhop. Malay. pl. 22, fig. 26) entirely accords.

I quote Mr. Distant's original description:—

? Var. *felderi*, Distant.—"*Male.* Wings less angular than in the preceding species (i. e. *æsopus*, Fabr.=*thetis*, Drury), the apex of the anterior wing and the anal angle of the posterior wing more rounded and less produced. Colour above as in preceding species; anterior wings with the black area smaller, the apical portion more regularly concave interiorly and narrower at outer angle; posterior wings with the outer black margin narrower. Wings beneath pearly white, markings as in the preceding species, but the fasciæ darker and more continuous, the apex of the anterior wings also broadly infuscated.—*Female.* Wings above pale orange-yellow; anterior wings with the costal margin, the apex, outer margin and outer half of inner margin broadly dark brown; posterior wings wholly dark brown, with the exception of a large discal orange-yellow patch extending from base of upper median nervule to apex of wing. Wings beneath as in the male, but with the fasciæ darker, broader and more regularly curved and continuous. Body above dark brown; sternum and legs greyish white, tibiæ and tarsi annulated with brown; palpi greyish white, their apices dark brown.

"*Exp.* Wings, ♂ and ♀, 40 to 45 mm.

"*Hab.* Malay Peninsula: Province Wellesley (*coll. Dist.*); Sugei Ujong (*Godfery and Durnford*); Singapore (*Kerr*)." Dr. Moore records it also from Mergui.

Subfamily IV. LIPHYRINÆ.

This subfamily was erected by the late Mr. Doherty (J. A. S. B. 1889, p. 409) for the reception of *Liphyra brassolis*, Westwood, a most remarkable Lycænid, isolated and aberrant to the last degree, and so far as known the sole representative of its genus. I give below Mr. Doherty's description of the egg, while the account of the adult * larva and of the pupa is taken from Dr. Chapman's exhaustive descriptions of the same published in the 'Entomologist,' vol. xxxv. 1902, pp. 225–228 and 252–255.

Egg. "Very unlike that of other *Lycænidæ* but shows an unexpected resemblance to that of *Logania*, Distant, and *Taraka*, Doherty. It is of great size, green overlaid with white, shaped something like a section or drum of a Doric column but somewhat widest at the base, the height, breadth at apex and breadth at base being to each other as 9, 13 and 15½. The top is marked with hexagonal reticulations, the lines turbinate in the middle, the margin deeply channeled and then strongly carinate. Sides crusted with white and minutely indented with about forty-five vertical ribs, slightly irregular and even (very rarely) anastomosing, extending also over the outer part of the base, the inner part being green and minutely reticulated with hexagons." (*Doherty.*)

Larva. "At first sight nothing could be less like a lepidopterous larva. Looking down on its back we have an approximately flat surface, oval in form, rather narrower in front than behind, with a margin smooth, regular, uniform and of the same texture, &c. all round, no trace of segmentation &c. Let us turn it over: it now lies on its flat dorsal surface, the dimensions of which by the way are 23 mm. × 15 mm. It stands up above the surface about 5·6 mm., with a level but not smooth top, but with smooth and sloping sides. The amount of the slope may be seen by comparison of the top and bottom; the top (venter of larva) is 18 mm. by 7 mm., against 23 × 15 just mentioned. The slope is nearly nil at the head end and by so much the more therefore elsewhere. The dorsum and sides are brown, hard and chitinous. The sloping sides show little indication of segmentation, but at the margin of the open (and soft) ventral area present a series of dark markings, very slightly raised on rounded elevations, but so shaded as to look very much so. . . . . . the small flat ventral area of the larva slightly wider anteriorly and presenting the head, legs, prolegs, &c. This area is pale and white and is the only portion where any movement can possibly occur, the rest being a solid chitinous cap. Constructed as it is to permit this

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* Dr. Chapman gives also in the publication quoted a description of what he took to be the young larva, but there seems to be some doubt about this (*cf.* 'Entomologist,' vol. xxxvi. 1903, pp. 36, 89, 170, 211).

soft area to be absolutely covered and hidden on the surface on which the larva rests, one is surprised at its widening out above this area quite regularly, till, at a sudden sharp margin, the sides meet the flat top. The brown marginal marks are apparently two to a segment, certainly so at the sides where they are largest and where a faint depression along the sloping sides seems to mark each segmental division. To see this however, requires close examination, some might say a little imagination.

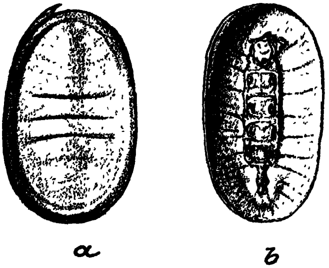

Fig. 100.—*Liphyra brassolis.*

a. Larva-case, upper side.
b. Empty larva-case, view of inside of upper half.

"Turning the larva over again to examine the back more carefully, we find the margin very sharp and slightly browner than the terra-cotta centre. Laterally and posteriorly it is a little hollowed within the margin. Across the middle are three very distinct lines, darker in colour and with the surface in front of them decidedly higher than that behind. They occupy the middle two-fourths of the surface, but do not invade the fourths on each side next the margin. In front and behind these the indication of the segmental divisions are very obscure. A faint indication of a dorsal ridge exists in front of these lines. There are also a number of dots that appear to be obsolete hair-points, arranged in some degree as a transverse line across each segment, but with outlines enough to make such a statement a little doubtful and even misleading. The two segments marked out by the dorsal lines are the fourth and fifth abdominal.

* * * * * * *

"The head is nearly colourless, about 1·7 mm. wide; centrally below the mouth and pointing backwards is the labium or part of it, a pale conical rather than cylindrical process ending in a short chitinous tube (spinnaret?). On each side is a long palpus (maxillary?) of three joints, the last very small, projecting ventrally and apparently with a fleshy process (maxilla?) towards the middle line; in front is a tolerably normal labrum, square and notched below with a good many short hairs on its anterior surface.

* * * * * * *

"The labrum is very fixed in its position and moves little: even if I am deceived in this matter by having only stiff preserved specimens to deal with, it is certain that it fits down very closely and tightly laterally in the maxillary bases, leaving in front an oval opening between it and the labium within which the jaws are visible, with apparently some room for movement in the cavity thus formed.

"Each jaw carries three teeth, not mere notches as in Lepidoptera generally, but each tooth is a long sharp spine, capable of piercing, but certainly not of biting; each jaw is probably capable of meeting the other so that the teeth may interlock, but in the specimens examined one jaw is entirely in front of the other.

* * * * * * *

"Not so remarkable as a structural modification, but more so perhaps as connected with most unusual habits, is the modification of the jaws as piercing and tearing and no longer biting organs; and if I observe correctly, the alterations of the trophi into a suctorial tube, from which the jaws are just able to protrude is remarkably similar, functionally, to the tube surrounding the jaws in *Phyllocnistis*, though the details of structure and habits are so widely different.

"The jaws would most effectively take hold of the skin of an ant larva, piercing its skin at the same time in six places; they would then draw the piece so seized within the closed cavity formed between the labrum, labium and (laterally) maxillæ so that the juices of the larva could be easily sucked out." (*T. A. Chapman, l. c.*)

Pupa. "The pupa I have before me is very large, 28 mm. long, 14 mm. broad, and 10 mm. deep, whilst it is depressed in front in a way apparently due to pressure; were the rounded contour of the dorsum and sides continued its depth would be 12 mm. It is typically Lycænid in form, being very round at either end, broadest at fourth and fifth abdominal segments, narrower thoracically; head beneath; no moveable segments; no trace of cremasternal hooks or of any silken girth; first leg equally against head and antennæ. The maxillæ are well developed; they appear to contain no maxilla (? palpus), the specimen being close on emergence, but the labial palpi are very evident between them. The most apical feature of the pupa is a set of flanges or raised ribs. If the pupa was divided into a dorsal and ventral piece by a section through its widest dimensions, the line of section would mark one of these ribs, which starts round the abdominal segments from the anal angle of the wings (end of vein 1 *c*) and goes round the end of the pupa dividing the last segment into two portions; this segment is consequently of considerable antero-posterior dimensions, stretching a good way under the pupa but always having a portion as it were lifted right out on to the dorsum by having to be above the flange. The segmental incisions are all raised into double ridges,

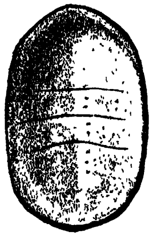

Fig. 101.—*Liphyra brassolis.* Larva-case with pupa inside.

but ventrally, *i. e.* below the marginal flange above noted, but with no trace of anything of the sort above it, each segment has another single ridge or flange about one-third of the way in front of each incision. The scars of prolegs are well-marked by large areas into which these ribs do not intrude.

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"The spiracles are more obvious than in the larva and occupy a similarly dorsal position. The pupa is very smooth and polished, at least thoracically; the abdomen has very numerous almost microscopic hair-points.

* * * * * * *

"The pupa inside lies quite free from any attachment to the skin, but the ventral depression of the pupa is due to its having to fit on the ventral aspect of the larval skin, which is raised centrally by the head, legs, prolegs, &c.

"The larval skin dehisces by cracking round the marginal crest in front, by a crack across the front of the three ridges, *i. e.* between third and fourth abdominal segments. The semicircular portion thus marked off again divides longitudinally into two portions." (*T. A. Chapman, l. c.*)

Imago. The perfect insect is as abnormal (for the *Lycænidæ*) as is the larva and pupa. In appearance it is like a very large skipper or moth. The head, thorax and abdomen are heavy and massive, but the absence of a precostal vein in the hind wing of both sexes, the shape of the antennæ, and in the ♂ the structure of the fore leg are entirely Lycænid.

Genus LIPHYRA.

Liphyra, *Westwood, Proc. Ent. Soc.* (3) ii, 1864, p. 31; *de N. Butt. Ind.* iii, 1890, p. 489.

Type, *L. brassolis*, Westwood, from Assam.

Range. Indo- and Austro-Malayan Regions.

♂ ♀. Fore wing: costa arched; apex subacute; termen convex; tornus rounded; dorsum sinuate, ciliated, about three-fourths the length of the costa; cell about half the length of the wing; vein 6 out of 7 beyond apex of cell, upper discocellular therefore absent, middle and lower discocellulars subequal, vertical; vein 7 ends on termen well below apex of wing; vein 8 out of 7, from apical half, ends on costa before apex of wing; vein 9 out of 7 from just before middle; veins 10 and 11 free; vein 12 terminates well beyond end of cell on costa. Hind wing: irregularly pear-shaped; costa slightly but widely angulated near base, then straight to apex; termen strongly rounded, tornus well marked, produced into a lobe; dorsum long, slightly convex; cell about half length of wing; middle discocellular short, concave, lower twice length of middle, strongly oblique; vein 1 *a* very short, ends before middle of dorsum; vein 3 from well before lower apex of cell; vein 7 at base much closer to apex of cell than to base of wing; vein 8 very slightly arched near base, then straight to apex of wing. Antennæ about half length of fore wing, no distinct club but gradually incrassate to apex; palpi porrect, gradually tapering to apex, third joint of moderate length, as thick at base as apex of second joint; eyes naked; body heavy and robust, reminding one in its stoutness of the body of *Charaxes.*

775. **Liphyra brassolis**, *Westwood, Proc. Ent. Soc.* (3) ii, 1864, p. 31; *Distant, Rhop. Malay.* 1884, p. 204, pl. 22, fig. 18 ♀; *de N. Butt. Ind.* iii, 1890, p. 491, pl. 29, fig. 243 ♀.
Sterosis robusta, *Felder, Novara Reise, Lep.* ii, 1865, p. 219, pl. 27 figs. 10, 11 ♀.

♂. *Upperside*, fore wing: black; the basal half of interspace 1, an oblique spot beyond apex of cell, the costal margin somewhat broadly along the basal half, strongly narrowed towards the apex, and the cilia ochraceous yellow. The yellow in the basal half of interspace 1 narrows outwardly, anteriorly spreads slightly into the cell and base of interspace 2 and posteriorly to the dorsal margin near base of wing. Hind wing: ochraceous yellow with the following black markings:—a broad streak from base of wing in cell widened outwardly that leaves an anterior small portion below base of subcostal vein and a posterior small portion along apical half of median vein of the ground-colour; terminal margin very broadly black, that colour however, not extended to the apex or tornus; between this marginal band and the cellular streak is an irregular patch connecting them; cilia ochraceous; abdominal fold paler ochraceous. *Underside*: dull earthy ochraceous, paler along the dorsal area and at apex of fore wing and on the termen near apex of hind wing. Fore wing: a medial large irregular brownish-black patch that occupies the apical half of the discoidal cell and the basal thirds of the interspaces 3 and 4. Hind wing: costal margin with transverse mottlings of reddish brown. In some specimens the ground-colour on the underside is pale dull purplish with shadings of darker purple; on the fore wing the medial black patch large and the basal area internal to the black patch rich ochraceous yellow. Antennæ, head, thorax and abdomen ochraceous; beneath: in some specimens slightly paler.—

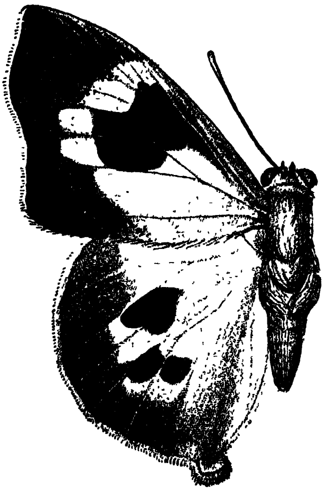

Fig. 102.—*Liphyra brassolis.*

♀. *Upperside*, fore and hind wings: rich ochraceous; markings on the latter wing as in the ♂, but the black streak in cell and the large spot or patch connecting it to the broad area of black along the termen much smaller, often divided into two detached spots; on the fore wing the black is reduced to a large medial patch that occupies the apical half of the cell, beyond and below it the bases of interspaces 5, 6, 10, and 11, the basal thirds sometimes more of interspaces 3 and 4, and a very broad, inwardly irregularly concave band that is produced inwardly along the terminal half of the dorsal margin and shortly along veins 2, 3 and 4. *Underside*: as in the ♂ but generally the ground-colour paler. In some specimens the whole hind wing with mottlings of brown such as are present in all specimens of both sexes along the costal margin of that wing. Antennæ, head, thorax and abdomen as in the ♂.

Exp. ♂ ♀ 86–92 mm. (3·38–3·64″).

Hab. Sikhim; Assam; Malayan Subregion to Australia.

A very variable form. The description given above is taken from Sikhim and Assam specimens. Specimens from Malacca and south and east through the subregion have a decreasing amount of black colouring on the upperside. Australian specimens have the least of all. In Australian specimens too the antennæ, the head, thorax and wings on the upperside are covered often with a curious irregular irroration of white fugitive scales, and the abdomen on both sides and beneath towards the apex by a dense mass of brown hairs each of which terminates in a flattened broad plume-like scale.

So remarkable and abnormal is this form that under subfamily characteristics I have not hesitated to quote a very large portion of the lengthened description of the larva and pupa given by Dr. Chapman; also, as the insect is found in Sikhim and Assam, I venture to give extracts from a note on the habits both in the larval and imaginal states of this very curious butterfly. The note is by Mr. F. P. Dodd of Queensland, the original discoverer I believe, of the larva.

Mr. Dodd says ('Entomologist,' xxxv, 1902, p. 153):—"One correspondent stated 'that it is said to be found in ants' nests in its larval and pupal stages.' . . . . Another correspondent informed me that his book gave it as a twilight flier, with a query, and they suggested that larvæ may be carnivorous feeding on wooly bugs.

"I had already seen a female on a warm sunny day in July 1900, depositing eggs upon a tree which was in complete possession of the wonderfully interesting green tree-ant *Œcophylla smaragdina*, Fab., which exists here in vast numbers in the coast and mountain scrubs. Upon this tree there were several large nests of the ants and the butterfly would rapidly fly over the top of the tree once or twice, then come underneath and settle on one of the branches near the trunk; there were four spots to which it returned at different times after its flights, and upon examination

I found that there were two or three eggs deposited on each. Judging by the number of flights I believe only one egg was laid at each rest. I have since frequently seen the eggs on other trees in ones, twos, or more; but deposits of two, in several different places, is the number usually to be met with. They are placed on the underside of branches or protected side of trunk. I took several of the ova and in twenty two days the larvæ, flat, oval creatures appeared, but of course refused to eat, and died. I had taken them on the chance of their being leaf-eaters, and with the ants merely for protection, as I found is the case with several other Lycænids of ours—*Arhopalas* and *Hypolycæna phorbas.*

* * * * * * *

"During the next few months I examined scores of nests (of ants) in the hope of finding larvæ of this, to me, mysterious insect, but without success. However, eventually I stumbled across a larva when searching an ant's nest for other insects. This specimen was half-grown, the size and shape being about that of a medium-size lozenge with a rim as in a coin bordering it all round, but raised somewhat along the dorsal surface; colour a very pale yellowish-brown, seven dark spots on each side near margin, and across the centre of the dorsal surface there were three furrows reaching nearly to sides; these furrows are constant through all the moults . . . . . nor do they (the furrows) disappear *even when the larval skin becomes the outer pupal shell.* The head, legs and claspers are in a groove the edges of which close tightly all round, consequently they are seldom seen except of course during progression, when the body is raised a little.

"After this discovery I met with other larvæ, generally larger and of a darker brown, and finally obtained pupæ and bred out a series of the perfect insect.

* * * * * * *

"Taking several larvæ and supplying them with ant-grubs of various sizes, I soon had the satisfaction of observing one individual approach a half-grown grub, deliberately seize it and withdraw it from sight; but being impatient I turned him over soon after and slowly released his hold of the grub; unfortunately I failed to observe anything of the kind again. Finding that the caterpillars did not thrive upon ant larvæ alone they were supplied with small nests containing ants and pupæ as well, but in a week or so they showed signs of sickness. By changing the ants' nests I kept several other caterpillars for nearly two weeks; they also became sickly and had to be returned to nests on the trees. However, they deposited frass showing that they had been feeding; this is small for such bulky creatures, is grey or white and is greasy-looking. So though I cannot positively declare that they exist upon the ant larvæ, I am quite satisfied myself that they do.

* * * * * * *

"*Moulting.* When the caterpillars are about to cast their skins they spin a webbed footing nearly their whole length to which they affix themselves rather firmly; but in many instances the ants *utilizing the web of their grubs*, secure them still more firmly to their position, the web reaching halfway to or even up to the rim. Whether this ant web is added with friendly intent or with a view to fasten down a larva to get rid of him if possible is a puzzling matter; still I have not met with any dead larvæ so fastened. Pupæ are occasionally treated in a similar manner without the escape of the butterflies being prevented. The larger larvæ require three or four days after taking up their moulting position to crawl out of their old skins, which become a little darker and finally split downwards under the front edge and right and left along the rim.

* * * * * * *

"*Change to the pupa.—The larval skin is not cast off*, but changes in shape and becomes a comparatively strong and outer covering. The insect shrinks away from this and becomes detached so that it can be shaken like an *Antherea* pupa in its cocoon or a nut in the shell. The true pupal skin is very thin and transparent, and, provided of course the outer shell is opened, the colour-changes of the chrysalis can be observed plainly. After the larva has taken up its position for the transformation there is no change for thirty-six hours or so, the first being a narrowing of the thoracic portion, with an increased thickness in same. Upon examining the future pupa, at this time underneath, it will be noticed that the shell has closed in on each side, enveloping the head and legs completely; no closing in upon the prolegs occurs. For some hours no further alteration takes place, then the remaining portion of the creature contracts accompanied by a considerable rise in the dorsal surface; the pupal change so far as can be ascertained from outside observance being now complete.

"The perfect insect comes forth in twenty-one to twenty-five days and further astonishing developments in the life-history of this strange insect occur." Of the freshly-emerged imago Mr. Dodd says:—"Instead of the weak drooping wings of a butterfly, he has little short appendages like a freshly-emerged moth and lying very flat; the front wing is creamy white and the tip of the hind wing projects from under this ever so little; the abdomen looks very large, a thick mass of furry-looking substance showing on each side of it to the tip; on the thorax small tufts of loose brownish scales may be noted which easily roll off. It is soon seen that the white appearance of the fore wing is caused by a dense covering of fugitive scales; there is also a small patch on each side of the thorax. . . . These white scales fly off after the expansion of the wings at the least breath of air. . . . The matter on the abdomen is also of course composed of scales, they are dark grey, packed very densely and cover about half of the ventral surface, reach further along the sides but do not reach the thorax, none being on the upper surface. These are much more adhesive and must be scraped away, as they cannot be blown off; they come away in masses and fasten lightly to anything they come in contact with and appear to be held together. Upon examining them with a lens exceedingly delicate threads can be discerned dispersed throughout.

* * * * * * *

"As to the butterfly being crepuscular in its habits, I may mention that I am frequently out in the twilight, but have not met with it. . . . . . .

"Concerning the loose scales on this unique butterfly we have no evidence that the larvæ are welcome inhabitants of the ants' nests. However, it is highly probable that the ants have no friendly feeling for the perfect insect and would most likely attack and kill it during its long rest after emergence if it were not especially and wonderfully protected. So it will be seen that the loose scales act as a perfect protection, for directly the ants encounter these they are in trouble, they fasten on to their feet and impede their movements or, if their antennæ or mandibles come in contact with any part of the butterfly, the scales adhere thereto, so that the ant is soon in a bad way and has quite enough to do in attempting to free himself of his encumbrances without taking any further interest in the butterfly, from which he retreats as well as possible. It is exceedingly ludicrous to observe the ants endeavouring to free themselves, their legs move awkardly and their mandibles are opened and closed in evident annoyance and perplexity, and they are also much concerned about the state of their antennæ for the obnoxious scales will not be shaken off, and they seem to become very low-spirited."

Returning to the larva in its armour of chitin Mr. Dodd adds:

"The larvæ of *L. brassolis* are evidently so tough-skinned that the mandibles of the ants can make little or no impression on them, for in placing specimens upon a nest, the inmates rush out at them, catch hold of the caterpillar rim and appear to be acting most viciously. They also endeavour to reach the head and legs, but these are at once protected, the creature just lowers its great sides and is secure. After examining caterpillars which have been on the nests for several hours, and tugged at and nipped by dozens of ants, not a mark or a wound was descernible; yet if the slightest cut is made in the rim with a knife, juices issue as from any ordinary caterpillar with an opening in the skin."

With regard to the larva of this butterfly feeding on the larvæ of *Œcophylla smaragdina*, Mr. R. Turner informs me on the authority of Mr. Olive, a friend of his who has bred the insect, that he found it on a small tree, *Sarcocephalus cordatus* *, Miq., and that to the best of his belief the larva feeds thereon as the leaves had the appearance of being eaten. It is quite possible that the larva of this most remarkable form may be partially carnivorous as well as a leaf-feeder. Mr. Olive also affirms that *Liphyra brassolis* unless accidentally put up in the day-time is entirely crepuscular in its habits.

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* The tree occurs in Burma and is the "Ma-u-lettan-shé" of the Burmese.

Subfamily V. PORITIINÆ.

Egg. According to Mr. Doherty the egg is "hexahedral" in shape, "like a truncate pyramid, nearly twice as long as wide, with two vertical and two sloping sides, the former trapezoidal, reticulate near their upper edges; the latter and the apex nearly square, delicately reticulate. Along with those of *Liphyra brassolis*, Westw., they are the most remarkable eggs in the family."

Larva. Unknown.

Pupa. That of one form *P. harterti* is described by Mr. Doherty as follows:—"The chrysalis somewhat resembles those of the *Erycinidæ* (=*Nemeobidæ*) and strikingly illustrates the singularity of the group. It is suspended, not girt, but rigidly inclined to the surface of the leaf. It is less compact in form than that of other *Lycænidæ*, and is studded with bristles. Of these a number on the side of the head are white, with two black ones on each side on the top of the head and one black one on each side of the thorax above the thoracic angle. The second, third and fourth abdominal segments have each a lower white and an upper black bristle, approximate laterally, while the last segments have a number of white lateral and of black subdorsal ones. The ground-colour is ochreous, much marked with dark, especially on the upper surface of the abdomen, each segment having a black line near its hind margin, except the first, which has two black spots dorsally. The wing-covers are veined and bordered with brown."

Imago. Of moderate expanse and characteristic colouring. On the upperside the males are mostly velvety black, with streaks of blue; the females brown with similar streaks, and generally in addition some yellow markings. In both sexes of all the forms veins 5, 6 and 7 of the fore wing are closely approximate at base.

Within our limits two genera of this subfamily occur. One, *Zarona*, is remarkable in that the forms arranged under it have in the fore wing all twelve veins present. The genus *Pseudodipsas*, Felder, of which one form, *P. cephenes*, Hewitson, is given from India, has only a superficial likeness to the forms of the *Poritiinæ*. Its venation clearly shows its affinity to the *Theclinæ*.

Key to the Genera of the Poritiinæ.

A. Fore wing: vein 8 absent; males with secondary sex-marks	Poritia, p. 457.
B. Fore wing: vein 8 present; males without secondary sex-marks	Zarona, p. 470.

Genus PORITIA.

Poritia, *Moore, P. Z. S.* 1865, p. 775; *Hewitson, Ill. Di. Lep.* 1878, p. 213; *Distant, Rhop. Malay.* 1884, p. 197; *de N. Butt. Ind.* iii, 1890, p. 37.

Simiskina, *Distant, Entomologist,* xix, 1886, p. 12.

Type, *P. hewitsoni*, Moore, from Sikhim.

Range. Eastern Himalayas at low elevations ; Assam ; Burma ; Tenasserim ; Malay Peninsula ; Sumatra ; Java ; Borneo.

♂ ♀. Fore wing: costa very slightly arched, nearly straight; apex well marked, somewhat acute; termen convex; tornus distinct, angular, not rounded; dorsum slightly convex, about four-fifths the length of costa; cell not half length of wing; vein 6 at base closely approximate to base of 7, upper discocellular therefore practically absent; middle discocellular short, about half length of lower, both erect; lower discocellular attenuated; veins 3 and 4 well separated at base, 5 closer to 6 at base than to 4; 8 absent; 9 from apical half of 7; 10 from apical half of subcostal; 11 very short, running into and anastomosed with 12; 12 terminates on costal margin not opposite to but well beyond upper apex of cell. Hind wing: costa very strongly arched along basal half, thence straight to apex; termen curved from apex to vein 4, thence obscurely dentate at apex of each vein to tornus; tornus angulate; dorsum slightly convex; cell very short, not half length of wing, comparatively broad at apical end; middle discocellular shorter than lower; vein 1 *a* terminates midway on dorsal margin; veins 3 and 4 from lower apex of cell, 7 at base midway between base of 8 and 6; 8 short, very strongly curved, terminates on the costal margin well before apex of wing; precostal area broad. Antennæ slightly longer than half length of wing, gradually incrassate to apex; club therefore long and very gradual; palpi porrect, broad anteriorly, clothed with short scales, not fringed with hairs; third joint short, naked, pointed at apex; eyes naked; body comparatively robust; legs comparatively stout; front tarsi in ♂ with the joints not well marked, shortened, the claws minute and very rudimentary; in ♀ the front tarsi are similar but the claws are normal and distinct.—♂. Sex-mark an oval patch in the cell of the hind wing on the upperside, of a colour different from the shade of the ground-colour and covered by a tuft of soft hairs. Ordinarily these hairs are pressed down under the fold of the fore wing and point upwards. In the living or freshly killed insect the hairs have a strong but not disagreeable odour and I have noticed that a ♂ *P. hewitsoni* had them erect while flitting round and courting a ♀.

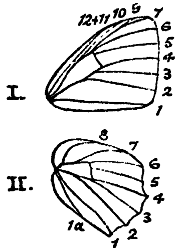

Fig. 103.—*Poritia.* Venation.

Key to the forms of Poritia.

♂ ♂.

A. Underside: markings consist of transverse catenulated bands and annular spots.
  a. Upperside fore wing: cell entirely without or with only in some specimens a minute spot of blue at base.

a′. Upperside fore wing: blue colour extended into interspace 2; subterminal spots and upper discal markings of blue generally present .... *P. hewitsoni*, p. 460.

b′. Upperside fore wing: blue colour never extended into interspace 2; subterminal spots and upper discal markings of blue never present .... *P. sumatræ*, p. 462.

b. Upperside fore wing: basal half or more of cell blue.

a′. Upperside fore wing: no preapical or subterminal spots or streaks of blue.

a^2. Upperside fore wing: blue colour not extended into interspace 3 .... *P. pleurata*, p. 464.

b^2. Upperside fore wing: blue colour extended into base of interspace 3.. *P. phraatica*, p. 465.

b′. Upperside fore wing: preapical and subterminal spots and streaks of blue present .... *P. erycinoides*, p. 461.

B. Underside: markings consist of only discal and postdiscal transverse lines or bands, simple or lunular, not catenulated, and terminal non-annular markings.

a. Underside fore wing: a broad white discal band .... *P. harterti*, p. 466.

b. Underside fore wing: no white discal band.

a′. Upperside fore wing: blue or green markings along lower side of median vein form a series of short longitudinal streaks at the bases of interspaces 1 to 4 .... *P. phalia*, p. 467

b′. Upperside fore wing: blue or green markings along lower side of median vein form a continuous outwardly clavate streak .... *P. pediada*, p. 469.

♀♀.

A. Underside: markings similar to those of the males under A in above Key.

a. Upperside fore wing: with more or less of blue colouring.

a′. Upperside fore wing: a yellow discal patch above blue area.

a^2. Upperside hind wing: blue area comparatively large, consisting of outwardly broadened streaks in posterior interspaces .... *P. hewitsoni*, p. 460.

b^2. Upperside hind wing: blue area much restricted, reduced to discal quadrate spots in interspaces 3 and 4. *P. erycinoides*, p. 462.

b′. Upperside fore wing: no yellow patch; blue area large.

a^2. Upperside fore wing: subterminal transverse series of blue spots separated by a series of short, terminal, ochraceous-yellow lines along the veins .... *P. sumatræ*, p. 463.

b^2. Upperside fore wing: subterminal transverse series of blue spots without ochraceous short lines between, separated only by the ground-colour. *P. pleurata*, p. 464.
b. Upperside fore wing: without any blue colouring .... *P. phraatica*, p. 465.
B. Underside: markings similar to the males under B in above Key*.
a. Upperside: ground-colour yellow ...... *P. phalia*, p. 467.
b. Upperside: ground-colour brownish black. *P. pediada*, p. 469.

776. **Poritia hewitsoni** (Pl. XIX, figs. 144 ♂, 145 ♀), *Moore*, *P. Z. S.* 1865, p. 775, pl. 41, fig. 10 ♂; *Hewitson*, *Ill. Di. Lep.* 1878, p. 214, pl. 88, fig. 1 ♀; *de N. Butt. Ind.* iii, 1890, p. 39.

♂. *Upperside*: deep velvety black; posterior halves of both fore and hind wings more or less shining cobalt-blue that in some lights turns to brilliant emerald-green. On the fore wing the blue is restricted to the basal area below the cell, extended in interspaces 1 *a* and 1 further towards the terminal margin; it is also interrupted in the middle of the latter interspace by an elongate spot of the black ground-colour; apical half of the wing crossed beyond apex of cell by a more or less incomplete curved series of blue spots which in some specimens are absent, but when present the subcostal spots form an obliquely placed short bar, the lower spots remaining well separated. Hind wing: costal and dorsal margins somewhat broadly fuscous, not velvety black; blue area pear-shaped, not extended quite to the termen, with an outer and inner row of ill-defined small black spots and the anterior margin indented irregularly by the ground-colour. *Underside*: grey, varying from light dove-grey to dark grey, with a faint brownish tint. Fore and hind wings transversely crossed by slender zigzag golden-brown lines that are absent along a not very clearly defined broad medial band. These lines are closer together on the basal half of the wings and over the whole surface form more or less broken loops, rings and spots. Fore wing: a subtornal black spot edged internally with yellow and an outer, very slender, subterminal black line. Hind wing: with a similar subtornal spot and subterminal slender black line, but in addition in interspaces 1 *a*, 2 and 3 prominent linear zigzag black markings within the subterminal line. Antennæ, head, thorax and abdomen dull black; the antennæ speckled with white; the club yellowish brown at apex; beneath: the palpi, thorax and abdomen dull grey.—♀. *Upperside*: somewhat similar to that of the ♂ but differs as follows:—ground-colour dull fuscous black; fore wing: the blue markings similar, but the blue area below the cell much restricted by the extension of the medial black spot which is much larger and spreads to the base and on to the dorsal margin of the wing near the base; above the blue area there is a conspicuous irregular yellow patch and the curved series of blue spots on the apical portion of the wing may, as in the ♂, be present or absent. Hind wing: the blue pear-shaped area on the posterior half of the wing reduced to short outwardly broadened streaks, which are further more or less irregularly interrupted by a transverse patch of the ground-colour; beyond the streaks there is a somewhat ill-defined posterior postdiscal series of black spots, darker than the ground-colour, bordered inwardly by a series of blue lunules and outwardly by a series of linear, more slender, bluish-white lunules, followed by a continuous slender terminal yellow line outwardly margined by black. Cilia of both fore and hind wings dark brownish black alternated with white. *Underside*: similar to that of the ♂ but the transverse zigzag loops and broken lines not so clearly defined nor so numerous, broader, more diffuse, often coalescing one with the other.

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* The ♀ *P. harterti* is unknown.

Exp. ♂ ♀ 35–40 mm. (1·4–1·54″).

Hab. Himalayas, at comparatively low elevations, from Kumaon to Sikhim and Bhutan; Assam; Chittagong and Arracan hill-tracts; the hills of Burma and Tenasserim.

A very variable form both in ground-colour and markings, especially on the underside.

777. **Poritia erycinoides,** *Felder* (Pseudodipsas), *Novara Reise, Lep.* ii, p. 259, p. 30, figs. 23, 24 ♂.

♂. *Upperside*: velvety black. Fore wing: the interspaces posterior to the cell overlaid with rich dark antwerp-blue from their bases outwards as follows:—interspace 1*a* for four-fifths of its length, interspace 1 for a short distance further but still leaving a terminal margin of the ground-colour which also indents the apex of the blue colour in that interspace, interspace 2 for half, 3 for one-third of their lengths; in some specimens in interspace 1 there is a short outwardly directed black streak in the middle of the blue area; interspaces 2 and 3 have detached subterminal blue spots; cell at base overlaid with blue, the upper edge of which is continued along the subcostal vein for a short distance; beyond apex of cell there is an obliquely-placed preapical series of blue streaks in interspaces 5, 6, 7 and 10; those in interspaces 5 and 6 the longest; sometimes the blue in these is interrupted which gives an appearance of a streak with a detached spot beyond in each. Hind wing: posterior half, except the abdominal fold, from base almost to the termen overlaid with rich antwerp-blue; this area bears near the termen a series of three transverse linear, black spots; costal margin broadly and abdominal fold fuscous, paler than the black of the ground-colour; within the cell touching the subcostal vein is a comparatively large oval yellowish area which bears an anteriorly directed tuft of long soft brown hairs (the secondary sex-mark); lastly, an anticiliary jet-black line most prominent opposite the apical end of the blue area. Cilia of both fore and hind wings brown, on the latter wing with a more or less interrupted line of white along their bases. *Underside*: ground-colour and markings very similar to those in some varieties of *P. hewitsoni*, but the transverse golden-brown lines are replaced by distinctly broader ferruginous bands which are also more regular and each edged inwardly and outwardly with dark brown; the spot above the tornal angle on the fore wing fuscous brown not black, large and diffused, the subtornal spot on the hind wing more broadly edged on the innerside with ochraceous. Antennæ black, the shafts ringed with white, the apex of the club ochraceous; the head and abdomen clothed with brownish hairs and scales, the thorax with greenish blue pubescence; beneath: the palpi, thorax and abdomen dull white, the last with a line of black on each side.—♀. *Upperside* brown. Fore wing: the blue markings as in the ♂ but of a pale cerulean-blue, the blue in interspaces 2 and 3 succeeded by a discal patch of ochraceous brown as in some specimens of *hewitsoni* ♀. Hind wing: the large posterior blue area in the ♂ reduced to two discal quadrate spots in interspaces 3 and 4; subterminal and terminal markings as in *P. hewitsoni* ♀. *Underside*: ground-colour very pale ochraceous or drab; markings as in the ♂ but the bands broader and paler in colour. Antennæ as in the ♂, head, thorax and abdomen much paler brown; beneath: the palpi and thorax white, the abdomen concolorous with the ground-colour of the wings.

Exp. ♂ ♀ 36–40 mm. (1·45–1·54").

Hab. Within our limits, Upper Burma: Maymyo, the Southern Shan States. Described originally from Java.

This appears to be an exceedingly rare form in Burma. I have personally seen only three males and two females. It seems to me probable that it is only a variety of *P. hewitsoni*, Moore, which is found both in Sikhim and Burma. If the two are identical Moore's name must be sunk as a synonym of *erycinoides*. The chief difference between *erycinoides* and *hewitsoni* lies in the shade of the blue colour on the upperside of the wings in the males, which is very striking when the two insects are placed side by side.

778. **Poritia sumatræ**, *Felder* (Pseudodipsas), *Novara Reise, Lep.* ii, 1865, p. 259, pl. 36, figs. 24, 25, 26, ♂ ♀; *Distant, Rhop. Malay.* 1884, p. 198, pl. 22, figs. 2, 3, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 42, footnote.

♂. *Upperside*: velvety black. Fore wing: interspaces 1 *a* and 1 from base outwards brilliant blue, changing in certain lights to rich metallic green, this colour in both interspaces stops short before the termen leaving a slender black margin, in interspace 1 it is narrowed outwardly, its upper margin from base of vein 3 sloped straightly outwards as if ruled. Hind wing: the costal margin broadly, the dorsal margin more narrowly dull brown; the posterior area from vein 1 to vein 7 and from base to termen brilliant blue, with a changeful sheen as in the fore wing; near the base anteriorly this colour circles round a yellowish oval patch which bears an anteriorly directed tuft of brown hairs (secondary sex-mark). *Underside*: dull brownish-grey. Fore wing: posterior basal area from dorsum to median vein silky and shining; a diffuse blackish spot below cell near base of interspace 1; costal margin above vein 12 brown; cell crossed by four comparatively broad rusty-red sinuate bars, the basal two of which are limited above and below by the subcostal and median veins, the third extends below into the base of interspace 2 and the outer edge of it into interspace 1, the fourth bar covers the discocellulars and extends to the middle of interspace 1; beyond these are discal and postdiscal transverse similar bands from a little beyond which the terminal margin is broadly pale rusty-red; the transverse bars and bands mentioned above are edged inwardly and outwardly with darker ferruginous red, and the broad rusty-red terminal margin has superposed on it a transverse series of irregular, slender, inwardly pointed rings of the ground-colour, one in each interspace, the ring in interspace 1 marked by a dark ferruginous-red spot on its inner side. Hind wing: transversely traversed by five bands similar to those on the fore wing, the inner two or three broken and interrupted, the outer two contorted and bent upwards near the dorsum; beyond these bands is an inner subterminal, ill-defined, zigzag, rusty-red narrow band edged outwardly with dark brown, an outer subterminal series of dark brown somewhat trident-shaped spots one in each interspace, and a terminal continuous ferruginous line edged very narrowly on the inner side with dark brown. Antennæ, head, thorax and abdomen dark brown, the antennæ obscurely speckled with white, the thorax with some long bluish hairs; beneath: the palpi white, thorax and abdomen pale ochraceous white.—♀. *Underside* fore wing: posteriorly from base outwards for three-fourths of its length below the subcostal vein and vein 4 pale lilac-purple, the outer margin of this colour very irregular projecting furthest outwards in interspace 1, beyond it the apex is broadly, the costal and terminal margins more narrowly brown; the latter margin carries a subterminal transverse series of pale lilac-purple spots in the interspaces, separated by broad lines of pale ochraceous along the apical portions of the veins; lastly, on the brown of the apical area is superposed an oblique upper postdiscal short series of three quadrate purple spots. Hind wing: dark brown costal margin above vein 7, dorsal margin below vein 1 paler brown, the area between these from base outwards for three-fourths the length of the wing overlaid with pale lilac-purple, beyond which is a subterminal series of very dark brown spots, one in each interspace, edged on the inner side, somewhat broadly on the outer side more narrowly with purple. *Underside*: ground-colour and markings much as in the ♂, but the transverse bands slightly broader and duller in colour.

Exp. ♂ ♀ 36–42 mm. (1·44–1·66″).

Hab. Sumatra; Malay Peninsula; just entering into our limits at the extreme south of Tenasserim.

A single broken specimen was in a collection from Southern Tenasserim sent to me to be named by Mr. K. Macdonald, D.S. of Police, Burma.

779. **Poritia pleurata**, *Hewitson, Trans. Ent. Soc.* 1874, p. 346; *Distant, Rhop. Malay.* 1884, p. 199, pl. 22, figs. 5, 6, ♂ ♀; *de N. Butt. Ind.* iii, 1890, p. 40, pl. 26, fig. 160 ♀.

♂. *Upperside*: velvety black. Fore wing: posterior half from base outwards and a broad streak that fills the basal three-fourths of the cell brilliant blue, in certain lights rich metallic green; the outer portion of the blue streak in cell narrowly separated from the blue below the median vein by a short streak of the ground-colour; the blue area on the posterior half of the wing fills the whole of interspaces 1 *a*, 1 and basal three-fourths of 2 except a narrow terminal edging of the ground-colour; the blue is also interrupted by a short, very narrow streak of black along the middle of vein 1 and another similar but much shorter line along middle of vein 2. Hind wing: the ground-colour broadly along the costal, more narrowly along the dorsal margin, paling to dull brown; secondary sex-mark of a tuft of anteriorly directed hairs brown, placed on an oval yellowish patch; posterior portion of the wing brilliant blue with the same changeable sheen as on the fore wing; this colour widening outwards from a comparatively narrow streak at base till on the termen it extends from vein 1 to vein 5; interrupted only by an ill-defined, incomplete, subterminal series of narrow transverse spots of the ground-colour. Cilia of both fore and hind wings black. *Underside*: very pale silvery-grey with numerous markings of rusty-brown as follows:—Fore wing: cell crossed by four or five short catenulated bars that do not extend below the median vein; a transverse very irregular narrow band along the discocellulars continued to vein 1, this is widened and forms a sort of double streak between veins 2 and 4; beyond there is a discal sinuate irregular catenulated band each link of which is inwardly conical, a similar postdiscal band each link of which is outwardly conical, and between the latter and the termen a series of more or less diamond-shaped spots of the ground-colour within each of which are some ill-defined brown markings and in the posterior spot of all a black smaller spot inwardly crowned with ochraceous. Hind wing: crossed by five or six catenulated transverse bands similar to those on the fore wing but all more or less sinuate, broken and interrupted; beyond these an inner, subterminal, irregular, transverse zigzag band ending in a small black spot near the tornus which is broadly edged on the inner side with ochraceous yellow, an outer subterminal series of large, very irregular, inwardly pointed spots and a slender articiliary black line. Antennæ, head, thorax and abdomen black, the antennæ ochraceous at apex, the thorax with a few bluish hairs; beneath: the palpi, thorax and abdomen white.—♀. *Upperside*: dark brownish-black. Fore wing: blue markings somewhat as in the ♂ but the blue is very pale, not at all brilliant, of a slightly purplish tint and more restricted towards the base of the wing so that a much broader outer margin of the ground-colour is left, this however, is transversely traversed by a curved series of five or six blue spots. Hind wing: blue markings much as in the ♂, but of the same pale shade as on the fore wing; postdiscally this colour is interrupted in interspaces 1, 2 and 3 by prominent, conical, inwardly-pointed spots of the ground-colour, beyond which is a series of three subterminal blue lunules enclosing three large conical spots between them, and a terminal blue line; the brownish-black ground-colour anterior and posterior to the blue area is carried uninterruptedly to the extreme margin of the wing. *Underside*: as in the ♂, but the transverse bands broader and paler. Antennæ, head, thorax and abdomen similar to those of the ♂ but brown, not black on the upperside.

Exp. ♂ ♀ 36–40 mm. (1·44–1·54″).

Hab. Described originally from Singapore; extends northwards through Tenasserim to Lower Burma.

The description above is taken from Tenasserim specimens; further south the ground-colour on the underside is darker, the transverse bands more regular.

780. **Poritia phraatica**, *Hewitson, Ill. Di. Lep.* 1878, p. 214, pl. 88, fig. 2 ♀; *Distant, Rhop. Malay.* 1884, p. 199, pl. 21, fig. 21 ♂, pl. 24, fig. 8 ♀; *Elwes & de N., J. A. S. B.* 1886, p. 430; *Moore, Jour. Linn. Soc., Zool.* xxi, 1886, p. 38; *de N. Butt. Ind.* iii, 1890, p. 41.

♂. "Allied to the ♂ of *P. sumatræ*, Felder, but larger, and with the black area of the fore wing on the upperside smaller, its inner margin somewhat concavely occupying the end of the cell, after which it is more or less convexly continued to the first median nervules and is then marginally continued to the angle, where there is a short black streak along the submedian nervure. *Underside*: both wings with the markings closely resembling those of *P. sumatræ*, but much paler in hue." (*Distant.*)

♀. *Upperside*: brown. Fore wing: a medial longitudinal broad streak that does not reach either the base or termen of the wing and is outwardly widened, bright rich yellow; cilia brown. Hind wing: a narrow transverse, in some specimens broken streak crosses the middle of the wing from vein 1 to vein 6; beyond which is an ill-defined, subterminal, black band more or less obsolescent anteriorly, with superposed yellow spots in interspaces 1 to 4, sometimes restricted to interspaces 2 and 3, and a slender white edging; cilia brown alternated with white. *Underside*: silvery white; markings very similar to those in *P. hewitsoni* ♀, but pale brown, not ferruginous, more irregular and more slender. Antennæ, head, thorax and abdomen brown; the shafts of the antennæ speckled with white; beneath: the palpi, thorax and abdomen white.

Exp. "♂ 1·10–1·4 inches," ♀ 39 mm. (1·50″).

Hab. Tenasserim: Ponsekai, Mergui; extending to the Malay Peninsula.

I have not seen a ♂ of this form; the description of the ♀ is from the type.

781. **Poritia harterti,** *Doherty* (Massaga), *J. A. S. B.* 1889, p. 128; *de N. Butt. Ind.* iii, 1890, p. 43.

"♂. *Upperside*: both wings black; markings seen from above lustrous sea-green, from any other direction more or less bluish, the tips of the scales being blue and slightly tilted downwards. Fore wing with six submarginal spots, the upper five small and subequal, arranged in a linear series, the lower slightly nearer the base, oblong and much larger than the others; a slender oblique fascia beyond the cell, divided by the discoidal nervules into three parts, the lowest longest: a stripe along the lower side of the median nervure extending to the base, a small part of it lying beyond the first median nervule which divides it; beyond this a wide transverse discal spot divided by the second median nervule into two portions outwardly, another stripe along the hind margin almost from the base, the outer end inclined upwards with a minute spot above its termination, separated from it by the submedian nervure. Hind wing with a large pale costal area; a tuft of long hairs appressed in the direction of the apex placed on a gland which forms a raised elliptical line on the underside above the origin of the first subcostal nervule; four submarginal spots, a diffused one extending from the median nervure halfway to the submedian nervure; a large obliquely-semicircular one, dark in the middle, in the first median interspace, a narrow crescent close to the marginal black line in the third median interspace and a small diffused spot in the next interspace, partly united with the upper discal spot; three discal spots, one occupying the submedian interspace from its base constricted in the middle, the end clavate and occupying the whole breadth of the interspace; beyond this two spots of moderate size in the median interspaces discally. *Underside*: both wings rufous brown with a slight bluish gloss. Fore wing: with a broad white band beyond the cell from the costa (where it is narrowest) almost to the hind margin; beyond it a broad space of darker richer brown, then a row of seven delicate whitish transverse submarginal streaks, of which the upper three are most distinct, crescent-shaped, the others obscure and irregular; beyond these a paler space with three whitish streaks parallel with and close to the upper three of the inner series; margin chestnut-brown; cilia chiefly light. Hind wing: basal part unmarked; a broad white band crossing the wing from the costa occupying the outer third of the cell, its inner margin well defined and but slightly irregular; the disc is covered with large rufous-brown markings in two very irregular series; the first four (those above the discoidal nervure) on a white ground, the others on a ground obscurely clouded with violet and whitish scales; two of these spots in the inner series and the median interspaces are much larger than the others, the outer one quadrate; a dark wavy outer discal line extends in a white ground to the third median nervule where it is interrupted, and from there to the anal angle on a whitish ground; marginal line orange-brown, bordered inwardly by a silvery line between which and the wavy discal line are, in the second median interspace, a blackish area, in the first median interspace a grey area, and thence to the anal angle a blackish line, inwardly bordered with reddish; cilia basally grey, outwardly dark.

"From *P. phalena*, Hewitson, from Singapore, of which it seems to be the northern representative, it differs in the narrow streak below the cell in the fore wing with the bifid spot beyond it and in the long mark in the hind wing. The hind wing below is quite different, much less white, the discal spots larger and of the general ground-colour, the submarginal spots absent and the apical rufous-brown space greatly reduced." (*Doherty.*)

Exp. "♂ 1·3 inches."

Hab. "Upper Assam."

Unknown to me. I believe a single specimen was procured by Mr. Doherty and so far as I know it has not been taken since.

782. **Poritia phalia**, *Hewitson, Trans. Ent. Soc.* 1874, p. 345, ♂; *id. Ill. Di. Lep.* 1878, p. 216, pl. 88, figs. 10, 11, ♂.
Poritia potina, *Hewitson, Trans. Ent. Soc.* 1874, p. 347, ♀; *id. Ill. Di. Lep.* 1878, p. 215, pl. 88, figs. 6, 7, ♀; *Doherty* (Massaga), *J. A. S. B.* 1889, p. 431, pl. 23, fig. 3 ♂; *de N. Butt. Ind.* iii, 1890, p. 44.
Simiskina fulgens, *Distant, Entomologist*, xix, 1886, p. 12; *id. Rhop. Malay.* 1884, p. 450, pl. 42, fig. 3 ♀.

♂. *Upperside*: velvety black. Fore wing: with the following rich antwerp-blue markings:—an oblong spot in the middle of interspace 1 *a*, a spot above its outer end in interspace 1, a series of spots touching the median vein and filling the bases of interspaces 1 to 3, two elongate spots beyond apex of cell and a slightly curved postdiscal series of marks, the anterior two small and macular, the posterior larger and more or less hastate with their points inwards, the one in interspace 1 the largest. Hind wing: costa broadly very pale brown, the secondary sex-mark of an anteriorly directed tuft of hairs concolorous with this pale area; dorsal margin paler posteriorly; interspace 1 filled with an elongate broad streak subinterrupted postdiscally and not continued quite to the terminal edge; interspace 2 with a short outwardly diffuse streak at base, an outwardly conical elongate spot in the middle followed by a subterminal lunular spot; interspace 3 with similar middle and subterminal spots—all these markings of a blue similar to that on the fore wing. Cilia of both fore and hind wings brown. *Underside* ferruginous. Fore wing: a broad pale area in the middle posteriorly, a short line on the discocellulars, a sinuate short vertical discal line not reaching the dorsum, a postdiscal very obscure similar line from costa to dorsum and a narrow terminal edging ferruginous, of a shade darker than the ground-colour; the transverse area enclosed between the discal and postdiscal dark ferruginous lines slightly paler towards the inner side, the apex beyond the postdiscal line also pale before the terminal edging. Hind wing: darkest on the costal area near base; a pale diffuse patch at apex of cell, a short line on the discocellulars, a discal curved lunular broken band, a transverse postdiscal ill-defined broader band followed by a sinuate line and a broad terminal edging, dark ferruginous. Antennæ, head, thorax and abdomen fuscous black, the shafts of the antennæ ringed with white; beneath: the palpi, thorax and abdomen white tinged with ochraceous.—♀. *Upperside*: rich ochraceous orange. Fore wing: the apex from the middle of the costa outwards dark brown, this colour continued as a well-defined broad band to the tornus and diffusely along the dorsum to the base of the wing, quite filling interspaces 1 *a* and 1 and crossing over the vein above into interspace 2. Hind wing: shaded broadly along the dorsal area with dark brown; an incomplete series of subterminal dark brown spots that become obsolescent anteriorly. *Underside*: darker ochraceous. Fore and hind wings: with transverse ferruginous lines and bands as in the ♂, but no pale patches either on the fore or the hind wings. Antennæ brown, the shafts ringed with white as in the ♂; head, thorax and abdomen ochraceous brown; beneath: the palpi, thorax and abdomen paler.

Exp. ♂ ♀ 40–43 mm. (1·54–1·68″).

Hab. Within our limits, Tenasserim: the Ataran and Thaungyin Valleys, Tavoy; the Malay Peninsula.

A rare insect; I got a ♂ at the foot of Nawalabo Mountain, Tavoy District, one ♀ in the Thaungyin Valley, and another which was sent to me from the Ataran Valley by Mr. C. W. Allan, of the Burma Forest Department.

The latter two differ from the type-specimen described by Hewitson as follows:—Ground-colour much paler with a bright ochraceous yellow both on *upper* and *undersides*. Fore wing on the upperside: brown markings much restricted, confined to a terminal series of very large quadrate spots in the interspaces broadly divided by the veins which are lined with ochraceous yellow. Hind wing immaculate. *Underside*: fore and hind wings: markings precisely similar to those of the typical ♀.

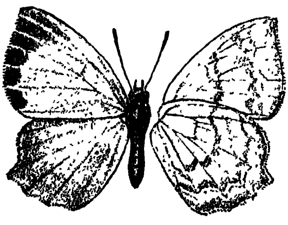

Fig. 104.
Poritia phalia, ♀ var.

783. **Poritia pediada,** *Hewitson, Ent. Month. Mag.* xiii, 1877, p. 223; *id. Ill. Di. Lep.* 1878, p. 218, pl. 89, figs. 21, 22, ♀; *Distant, Rhop. Malay.* 1884, p. 200, pl. 22, fig. 16 ♀; *Doherty* (Massaga), *J. A. S. B.* 1889, p. 430, pl. 23, fig. 15 ♂.

♂. *Upperside*: velvety black, with the following rich green markings which in certain lights assume a bluish tint:—Fore wing: an outwardly clavate streak along the lower side of the median vein; a small spot above it in the cell; a slender streak from base in interspace 1 *a* that meets an oblique elongate spot in the middle of interspace 1; a short upper discal, slightly oblique, maculate band that extends from just below the costa to vein 5 and is divided by the black veins; lastly, a transverse complete subterminal series of spots, the subtornal spot large, outwardly emarginate, the others smaller, subequal. Hind wing: a broad streak in interspace 1 not reaching the termen, with an indentation of the black ground-colour anteriorly at about two-thirds of its length; a postdiscal elongate spot in interspace 2, another similar spot in interspace 3 and a terminal posterior series of inwardly conical spots, the spot in interspace 1 with a transverse spot above between it and the apex of the streak; costal margin fuscous brown; abdominal fold paler brown. *Underside*: purplish brown. Fore wing: a discal irregular and interrupted band of pinkish-white spots; a postdiscal, sinuate, somewhat lunular, narrow, similarly coloured band followed by a terminal bright ferruginous edging, the area between the postdiscal band and the terminal edging much paler purplish brown posteriorly than the ground-colour of the rest of the wing. Hind wing: basal third darker purple-brown, the outer margin of this dark area irregular; an obscure, rufous-brown, medial, lunular band followed by a postdiscal, sinuate, curved dark line and a ferruginous terminal edging bordered inwardly by a very slender, obscure, silvery-white line; the space between the dark basal area and the postdiscal line irrorated more or less with whitish scales; beyond the postdiscal line there is on the terminal margin posteriorly a very obscure faint transverse series of dark lunules. Antennæ black, shafts ringed with white; head, thorax and abdomen very dark brown; beneath: the palpi, thorax and abdomen whitish ochraceous.—♀. *Upperside*: dark plum-brown. Fore wing: uniform, immaculate. Hind wing: also uniform and immaculate, except for an exceedingly slender subterminal white line that extends from vein 1 to 4. Cilia of both fore and hind wings brown. *Underside*: paler plum-brown. Fore wing: dorsal area medially pale; transverse, sinuate, discal and postdiscal slender whitish bands; the former single, vertical, extended from vein 4 to dorsum; the latter double, the outer line of the band very faint, the space between the inner and outer lines darker than the ground-colour; beyond this the terminal margin is brighter, almost ferruginous-brown at the apices of the interspaces. Hind wing: medial and dorsal areas pale, somewhat purplish; a discal curved series of ferruginous-brown lunules, followed by a postdiscal, curved, whitish sinuate line edged outwardly by a more slender dark line; this latter is most clearly defined posteriorly; finally, a very slender subterminal silvery white line that becomes obsolescent anteriorly. Antennæ, head, thorax and abdomen much as in the ♂, but paler on both upper and undersides.

Exp. ♂ ♀ 34–36 mm. (1·45–1·48″).

Hab. Tenasserim: Mergui; the Malay Peninsula.

The ♀ of this form and that of *P. phalia* have the termen of the hind wing indented above vein 4, with the apex of that vein produced and broadly dentate. In fact very like in outline to the hind wing of *Abisara angulata*.

Genus **ZARONA.**

Zarona, *de Nicéville, Butt. Ind.* iii, 1890, p. 34.

Type, *Z. jasoda,* de Nicéville, from Burma.

Range. Burma; Siam.

♂ ♀. Fore wing: costa very slightly arched; apex subacute; termen slightly convex; dorsum nearly straight, slightly convex in ♂, quite straight in ♀, about four-fifths the length of the costa; cell about half length of wing; veins 3 and 4 from its lower apex, veins 5, 6 and 7 from its upper apex, so closely approximate at base that practically there is no upper or middle discocellular, the lower discocellular long, erect; vein 8 from apical third of 7, vein 9 from basal half of 7; vein 10 from apical fourth of subcostal; vein 11 very short, anastomosed with vein 12 soon after origin; vein 12 terminates on costal margin not opposite to but well beyond upper apex of cell. Hind wing: subtriangular; costa strongly arched at base then nearly straight to apex; apex rounded; termen very slightly arched, nearly straight, slightly and bluntly dentate at the apices of the veins posteriorly; tornus bluntly angulate; dorsum long, slightly convex; cell about half length of wing; veins 3 and 4 from lower apex of cell or from a point a little beyond; vein 5 closer to 6 at base than to 4; vein 7 nearer to vein 6 than to base of wing; vein 8 strongly arched at base, terminates at apex of wing; precostal area wide at the humeral angle. Antennæ about half length of wing, gradually incrassate, club flattened beneath; palpi stout, porrect, thickly scaled anteriorly, not fringed with hairs, third joint short; eyes naked; legs short and stout; body robust. ♂ without any secondary sex-mark.

Only two forms have been described or recorded from within our limits, and as one is in all probability the ♀ of the other, a key to the forms is not necessary.

784. **Zarona jasoda** (Pl. XX, fig. 153), *de N., J. A. S. B.* 1888, p. 280, pl. 14, fig. 5 ♂ ; *id. Butt. Ind.* iii, 1890, p. 34, pl. 25, fig. 144 ♂ ; *Elwes, P. Z. S.* 1892, p. 620.

♂. *Upperside*: velvety black, with the following rich antwerp-blue markings :—Fore wing : a streak in interspace 1 *a* from base for three-fourths of its length, a very broad elongate spot above its apex in interspace 1 extended further towards the termen, a series of elongate spots or short streaks along the lower side of the median vein in interspaces 1, 2 and 3, and three minute obliquely placed upper discal spots in interspaces 4, 5 and 6. Hind wing: streaks from base that do not reach the termen in interspaces 1 and 2 greatly broadened outwardly, where they spread into interspaces 3 and 4; along the apical edge these streaks bear three or four superposed oval black spots; base and dorsal margin thickly covered with long fuscous hairs; costal and dorsal margins broadly pale. *Underside*: silky golden brown. Fore and hind wings: transversely crossed by an irregular, sinuate, discal, dark reddish-brown line edged on the outer side with white, followed by some obscure, pale, terminal markings and a slender dark ferruginous anticiliary line; tornal area of hind wing with a slight irroration of white scales, a slender, short, transverse black line and a subterminal black spot crowned inwardly with ochraceous in interspace 1. Cilia brown, on the hind wing alternated with white. Antennæ black tipped with ochraceous, the shafts ringed with white; head and thorax with greenish pubescence; abdomen brown; beneath: palpi and thorax sullied white, abdomen ochraceous.

Exp. ♂ 34 mm. (1·45″).

Hab. Burma; Tenasserim.

785. **Zarona zanella**, *de Nicéville, Butt. Ind.* iii, 1890, p. 35, frontispiece fig. 125 ♀.

♀. *Upperside*: brown. Fore wing: interspaces 1 *a*, 1 to 4 for more than half their length from base outwards and the posterior half of the cell overlaid with rich purplish blue; a dark brown transverse spot on the discocellulars. Hind wing: a medial patch that occupies interspace 1 from base outwards for about two-thirds of its length and basal halves of interspaces 2 to 4 purplish blue; costa and abdominal fold pale brown. *Underside*: ground-colour similar to that of *Z. jasoda*. Fore and hind wings: transversely crossed as in that form by a dark ferruginous discal line, but unlike that in *jasoda*, not edged outwardly with white and more irregular, more broken and interrupted, especially on the hind wing; terminal obscure markings much as in *jasoda* and a broader anticiliary similarly coloured line. Cilia of fore and hind wings brown, not alternated with white on the hind wings. Antennæ dark brown, ochraceous at apex, shafts ringed with white; head, thorax and abdomen as in *jasoda*, but paler on the upperside.

Exp. ♀ 38 mm. (1·48").

Hab. Tenasserim.

I have very little doubt that this form is only the ♀ of *jasoda*, but the type from which the above description is drawn is the only known specimen; I therefore provisionally keep it under de Nicéville's name. I caught the above specimen in January 1882 in the Méplé Valley on the frontier between Tenasserim and Siam.

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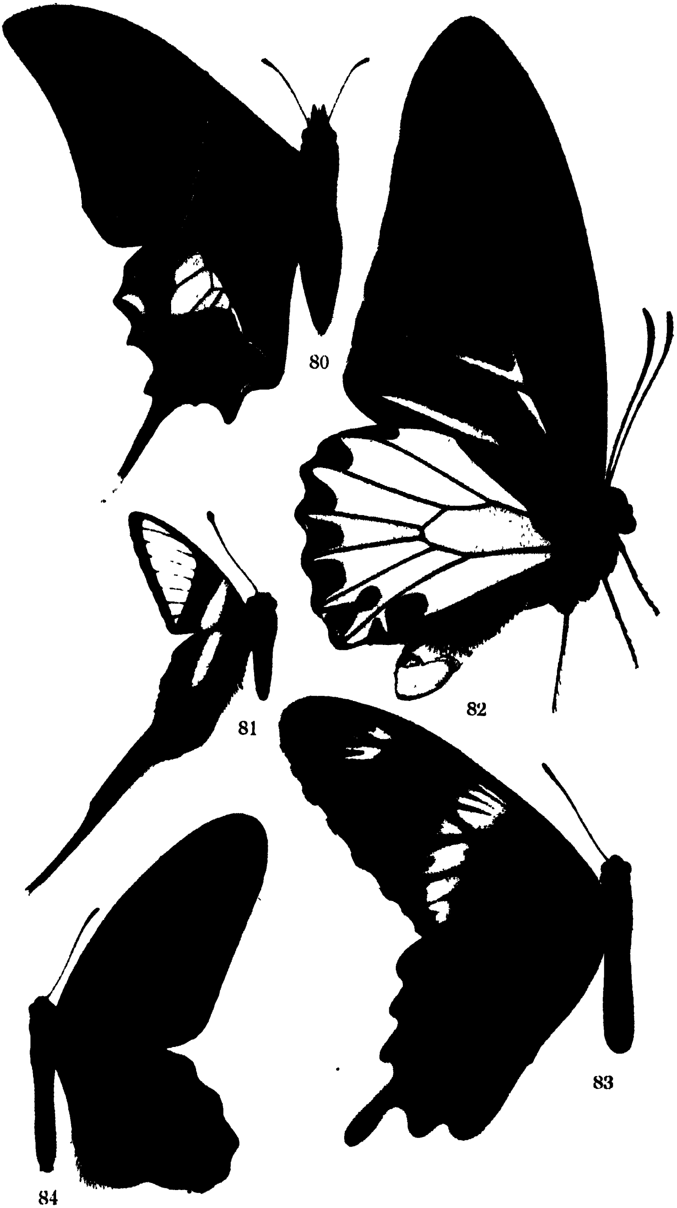

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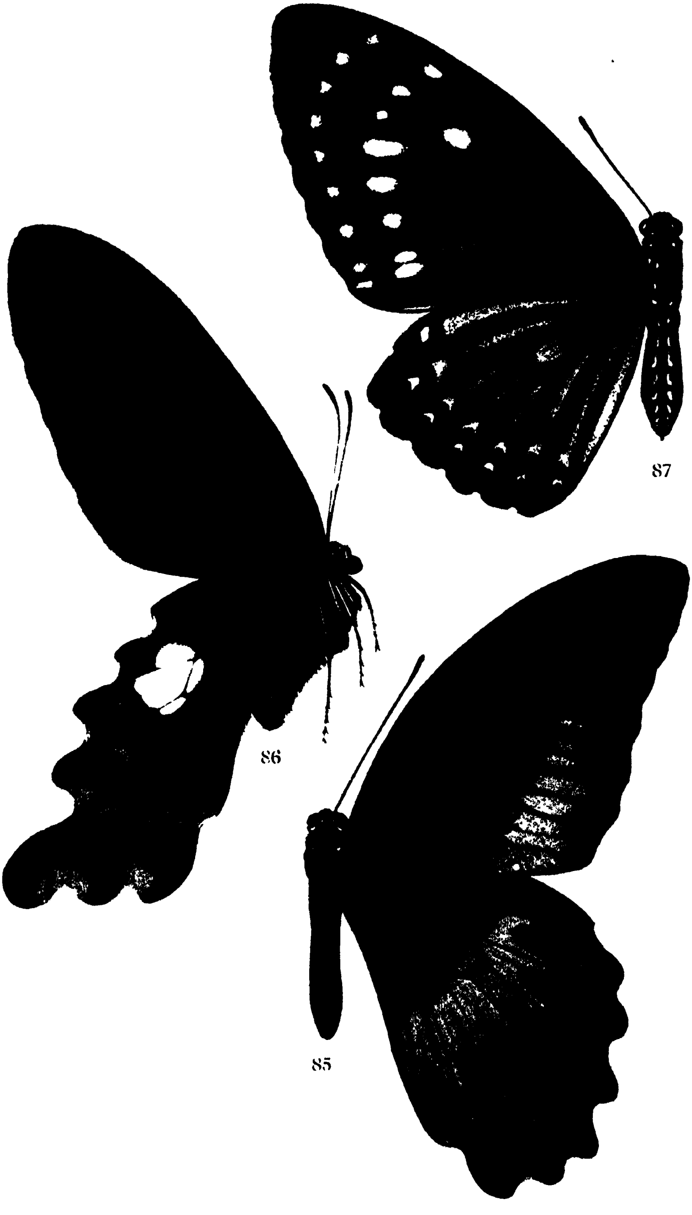

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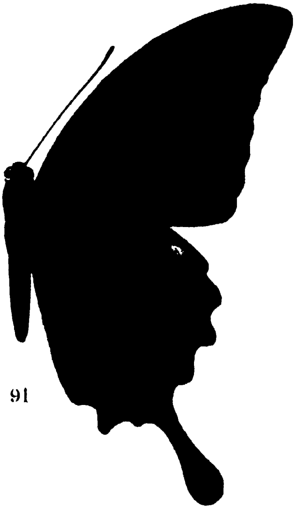

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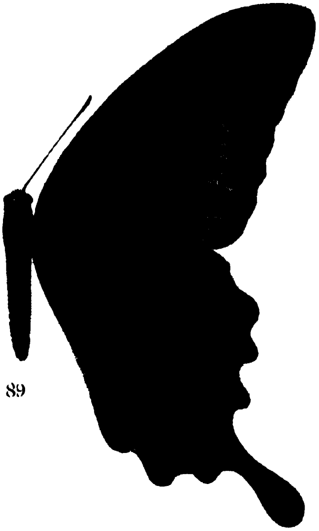

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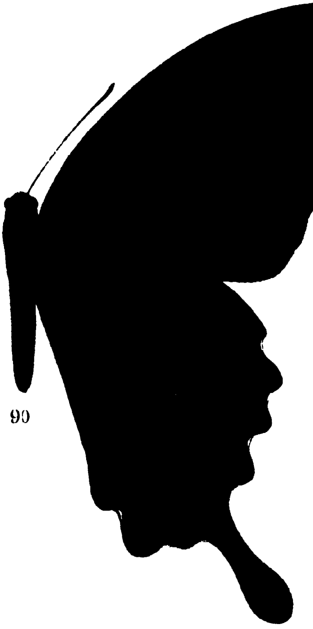

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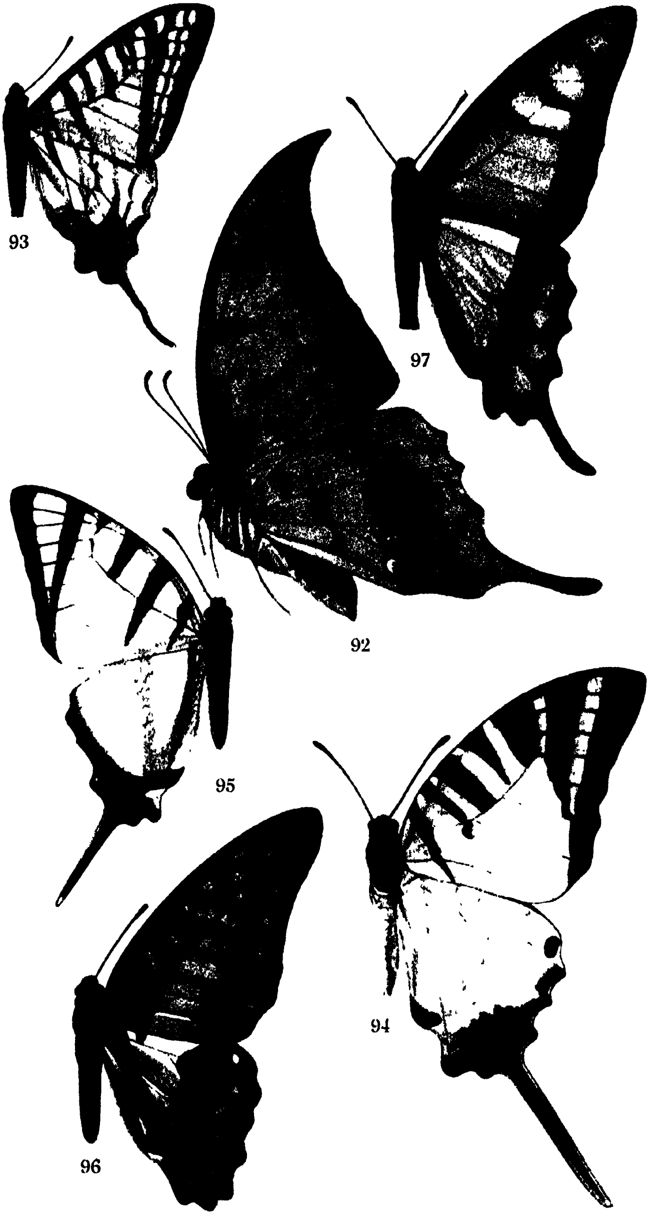

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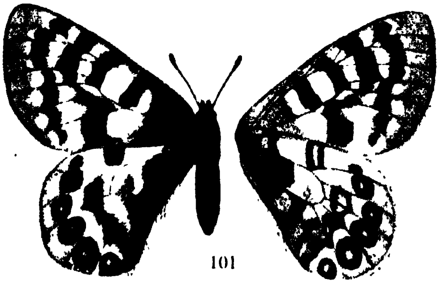
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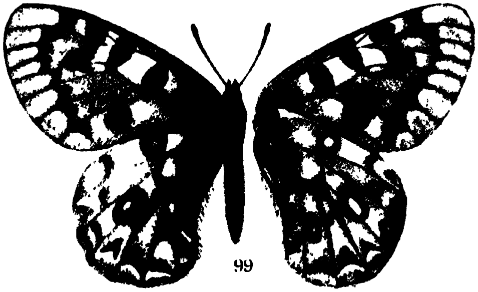
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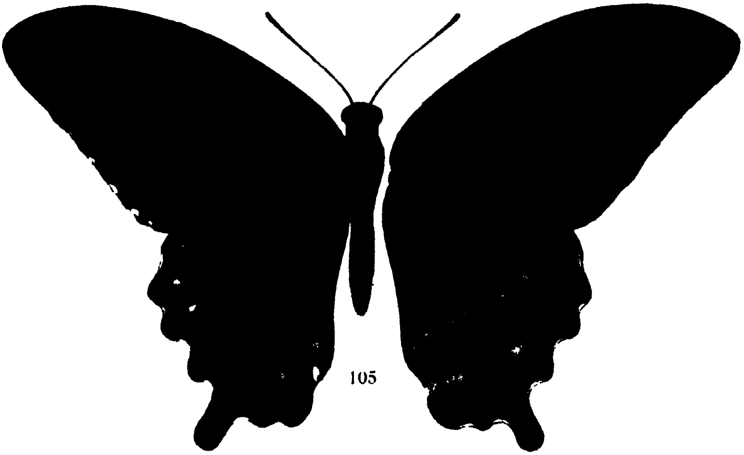

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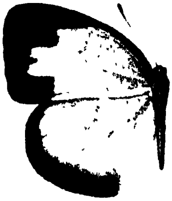

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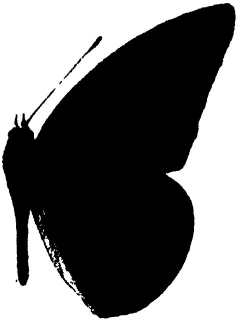

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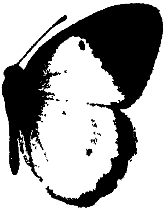

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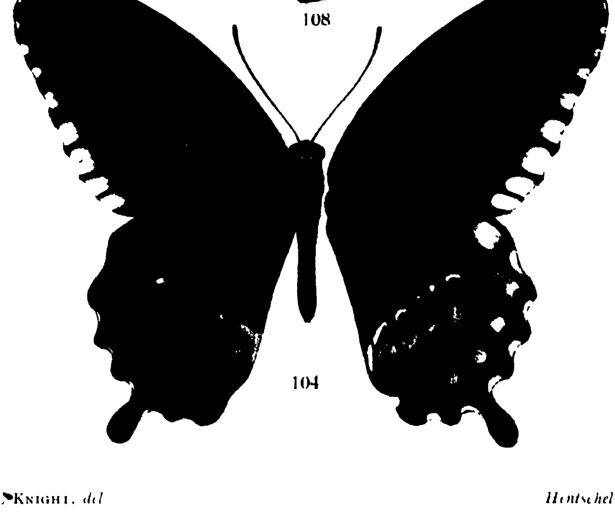

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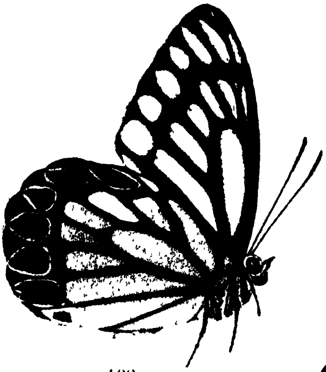

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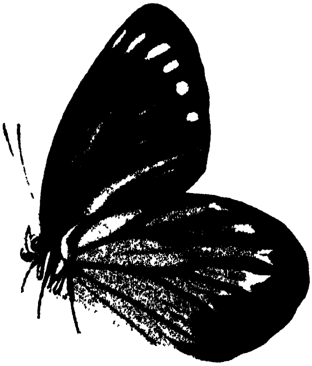

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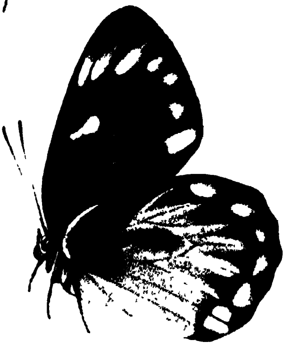

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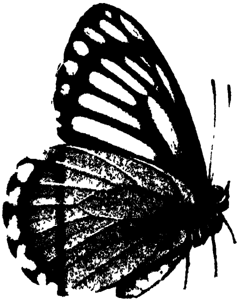

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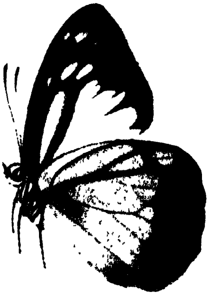

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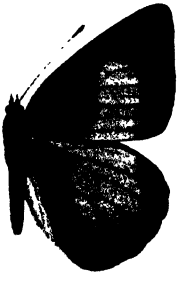

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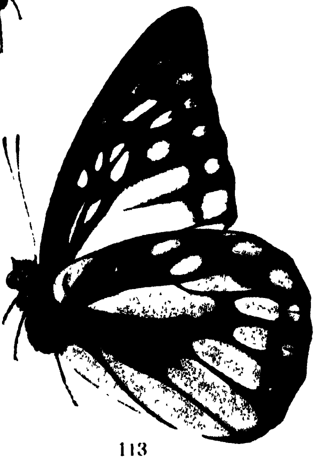

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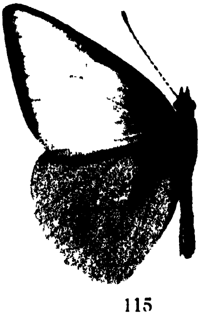

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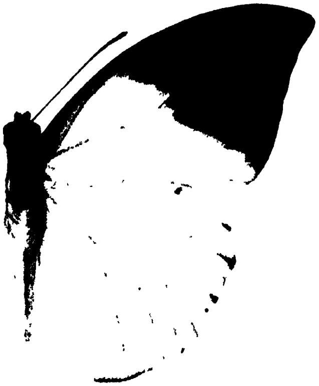

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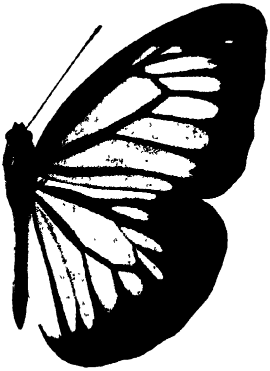

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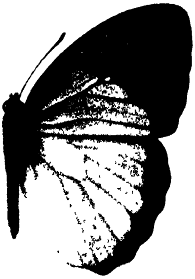

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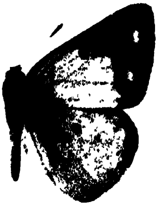

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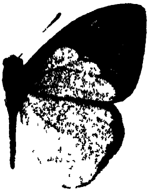

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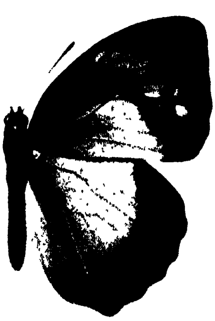

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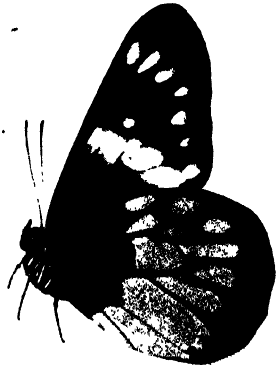

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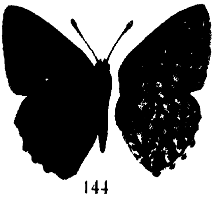
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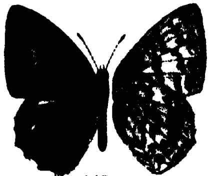
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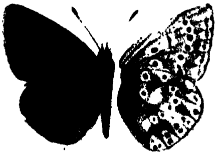
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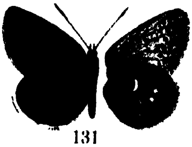
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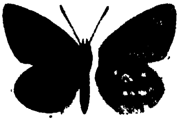
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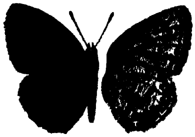
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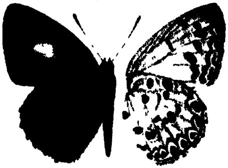
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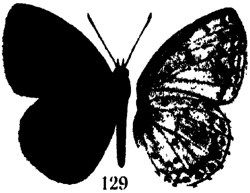
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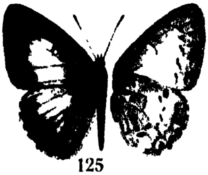
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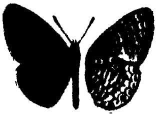
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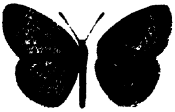
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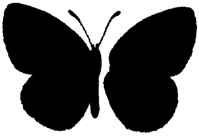
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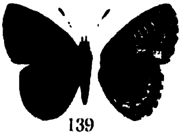
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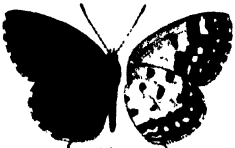
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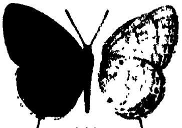
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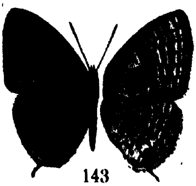
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HORACE KNIGHT, *del* *Hentschel Colourtype.*

PLATE XX.

Fig. 146. *Niphanda cymbia*, de Nicév., race *marcia*, Fawcett, ♂ .... p. 370.
„ 147. *Nucaduba bhutea*, de Nicéville, ♂ .... p. 386.
„ 148. *Lampides elpis*, Godt., race *kankena*, Felder, ♂. p. 408.
„ 149. *Lampides rogersi*, Bingham, ♂ .... p. 408.
„ 150. *Castalius ananda*, de Nicéville, ♂ .... p. 423.
„ 151. *Tarucus theophrastus*, Fabricius, ♂ .... p. 417.
„ 152. *Arhopala albopunctata* *, Hewitson, ♂.
„ 153. *Zarona jasoda*, de Nicéville, ♂ .... p. 471.
„ 154. *Arhopala areste* *, Hewitson, ♂.
„ 155. *Surrendra quercetorum* *, Moore, ♂.
„ 156. *Arhopala eumolphus* *, Cramer, ♂.
„ 157. *Arhopala agaba* *, Hewitson ♂.
„ 158. *Arhopala silhetensis* *, Hewitson, ♂.
„ 159. *Arhopala camdeo* *, Moore, ♀.
„ 160. *Arhopala aberrans* *, de Nicéville, ♀.
„ 161. *Arhopala tounguva* *, Grose-Smith, ♀.
„ 162. *Arhopala perimuta* *, Moore, ♀.
„ 163. *Thaduka multicaudata* *, Moore, ♂.

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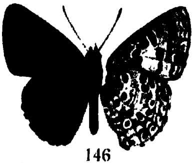
* Description will appear in Vol. iii.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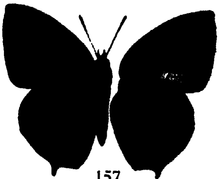
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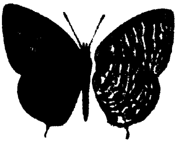
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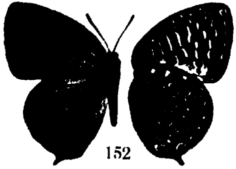
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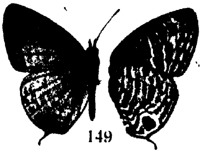
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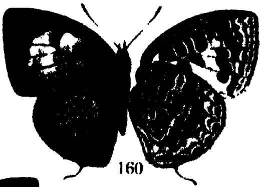
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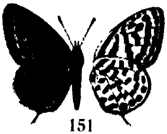
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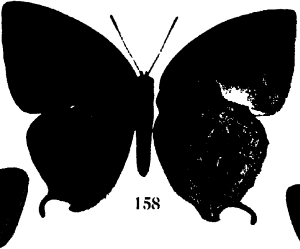
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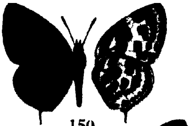
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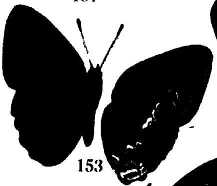
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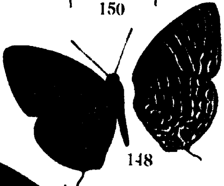
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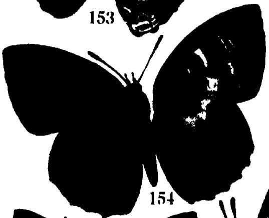
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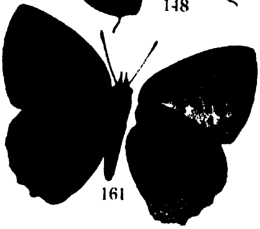
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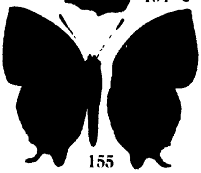
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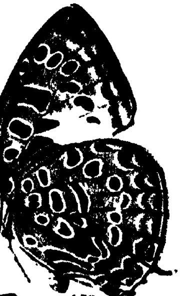
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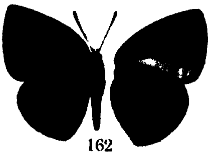
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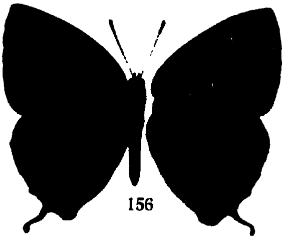
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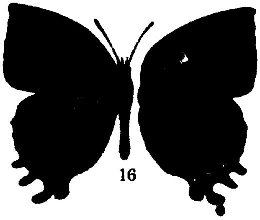
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HORACE KNIGHT, *del.*

Hentschel Colourtype.